MARINE REVIEW.

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Congress of Naval Architects and Marine Engineers.

Thus far only two lake members of the Society of Naval Architects and Marine Engineers, W. I. Babcock of Chicago and Joseph R. Oldham of Cleveland, have signified their intention of attending the international meeting of distinguished men of the ship building industry that is to be held in London in July. The London congress, to which all members of the American society have been invited, is to be a part of the celebration in honor of the sixtieth year of the reign of Queen Victoria. A large number of United States naval officers and members of the American society from eastern cities will undoubtedly attend, and the attendance from Germany and other countries is also expected to be quite large. The congress will be formally opened by H. R. H. the Prince of Wales at the Imperial Institute, London, on the morning of Tuesday, July 6. Mornings of the three following days will be devoted to the reading and discussion of papers. Visits will be paid to the yachting and fisheries exhibition at the Imperial Institute; to the London docks and Thames iron works; to Southampton docks and to the Royal dock yard at Portsmouth. In the evenings various social entertainments will be offered. Meetings of the congress in London will terminate on Saturday, July 10, and the guests are all invited in the following week to visit the works of the Fairfield Ship Building & Engineering Co. at Glasgow and of Messrs. Wm. Denny Bros. at Dumbarton; and on the return journey to London thy are invited to visit the works of Sir W. G. Armstrong & Co., Limited, at Newcastle-on-Tyne and of Messrs. Palmer at Jarrow-on-Tyne.

Lake Freight Matters.

Reports from mercantile agencies and trade publications all over the country tell of a little improvement in trade generally during the past ten days, and from some sources in the iron industry there are reports also of an increase in sales. The ore sales agents are disposing of some ore in small quantities from day to day, and a few of them are again of the opinion that the turning point has been reached and that the coming week will develop quite a large sales movement. This hope has, however, been held out for such a long time past that little dependence is now placed in anything but actual transactions. The number of cargoes offering in either the grain or ore trade does not seem any greater than a week ago. Ore freights are weak at 50 cents from the head of the lakes and the same rate from Marquette, with Escanaba charters at 40 cents. In most cases the ore moved from Marquette and Escanaba during the week at the rates quoted has gone to Buffalo, with no increase in freight on account of the longer haul and limited draft at the Buffalo furnace, to which a large part of the ore was consigned.

Officers of the Angeline Dock Co., a corporation controlling one of the iron ore docks at Ashtabula, were elected at Pittsburg a few days ago. They are: Directors—Jas. Laughlin, Jr., B. F. Jones, W. W. Willock, H. A. Laughlin, B. F. Jones, Jr., G. M. Laughlin, H. C. Fownes; president, Jas. Laughlin, Jr.; vice president, W. W. Willock; secretary and treasurer, Benjamin Page; general manager, W. G. Pollock.

Luce's "Seamanship" is a book that is specially suited to assist young officers of the naval reserve. It is being used by naval reserve organizations all over the country. It is a standard work, selling at $10, and will be mailed to any address at that figure by the Marine Review, 409 Perry-Payne building, Cleveland.

Accommodations for 400 first-class, 350 second-class and 800 third-class passengers will be provided in the big North German Lloyd passenger steamer Kaiser Wilhelm der Grosse (Emperor William the Great.)

Andrew Carnegie, who has about fully recovered his health, will sail for Scotland within a few days.

United States Light-House Service.

Under a system of increased appropriations from congress each year, and under the guidance of some of the best officers of the army and navy, the light-house establishment of the United States now leads the world in the work in which it is engaged. The entire sea coast proper of the United States, including the shores of Alaska, is 10,000 geographical miles long, and if to this length there be added the 3,000 miles of lake shore, as well as the islands and bays and the miles of rivers up to the head of tide water, the great total of about 100,000 miles will result. Altogether, there are maintained by the United States goverment for the express purpose of aiding the navigation of these waters by night no fewer than 2,860 lighted aids. In this number there are included all the light-houses, post lights, floating lights, light vessels, electric buoys and gas buoys. Of the unlighted aids there are about 5,548. Of this vast number, 315 are fog signals, sixty-six are whistling buoys and ninety-six are bell buoys. Of the plain buoys one sees when entering and leaving a harbor there are not less than 4,550.

The penetrating powers and ranges of powerful lights, such as are employed in the light-house service, rapidly decrease as the ratio of their luminous power increases. For instance, a light of 5,000,000 candle power in the British channel has in average weather a luminous range of about forty-four nautical miles, while if the light be increased to the power of 10,000,000 candles the luminous range is only five miles more, or forty-nine miles. According to current practice, lights up to 200,000 candle power are obtained by means of mineral oil lamps, while electric lights are used for higher powers, and almost any power may thus be obtained. The highest power yet attempted is about 36,000,000 at Penmark point, in the department of Finisterre, France, which when completed, will be the most powerful light-house illumination in the world. The height of the tower in which it is to be located is about sixty-three meters, enabling it to be seen during the day from a distance of eighteen miles in fine weather. During the night this light will be visible for sixty miles. The rotundity of the earth will prevent the rays from striking the eye directly at a distance of more than thirty miles, but the sky overhead will appear illuminated for thirty miles more. The estimated cost of this light-house is about $120,000.

Reports of Shoal Spots, Wrecks, Etc.

Geo. L. McCurdy of Chicago, who has undertaken the work of securing from vessel masters reports of obstructions, misplaced buoys, etc., is meeting with hearty cooperation from the men aboard vessels. As might be expected, several captains have written him about Pelee passage gas buoys, which have not as yet been placed on their stations. "If you have any influence with the Canadian officials," writes Capt. Jamieson of the steamer Minneapolis, "please use it in bringing about the establishment of these buoys, as they would be of great value to masters who are groping around these dark nights trying to make this passage." Delay in replacing these buoys this spring has been due to a misunderstanding between the Lake Carriers' Association and the light-house board regarding the care of them, but Capt. McKay of Cleveland says now that he expects to have the buoys in place early next week.

Capt. Chas. A. Benham of the steamer Sitka says to Mr. McCurdy in a letter dated May 24: "The lower clump of spiles and the light on Grosse point channel has been removed by some means. This light is especially important to vessels bound up at night."

Capt. S. M. Murphy of the steamer Corona reports a sunken obstruction bearing E. N. E. five miles from Waugochance light house, and directly in the passage of vessels bound east or west. He thinks the wreck is that of an old schooner with one mast hanging to it.

A part of the machinery for the new engine building plant of the Chicago Ship Building Co. has been ordered, and it is understood that both shops and equipment will be among the finest on the lakes.

Petroleum Fuel for Vessels.

Experiments undertaken recently by the United States navy have resulted in considerable discussion regarding the substitution of liquid fuel for coal aboard steam vessels. Several articles written by naval officers who have had charge of this work point to the conclusion that the advantages which would follow the adoption of naphtha fuel for use in torpedo boats are many and are more marked than would be the case with larger vessels. Principal of these advantages are the rapidity with which the bunkers could be filled; the storage of oil in such parts of the boat as were unfit for cargo.; diminution in the number of men necessary to tend the fires and of the physical fatigue of the firemen and greater power of the evaporation of liquid fuel, the proportion being seven to four. A modern torpedo boat, which at a given speed could go 4,000 miles, would, if she had in place of coal the same weight in oil fuel, steam 7,000 miles. Thus by this means her sphere of action would be nearly doubled. There is total combustion in oil fuel, hence ashes and cinders do not occur and there is no need of cleaning furnaces and sweeping flues. Finally, there is the complete absence of smoke. Could all these advantages be safely and surely secured there is no doubt that petroleum fuel would become universally adopted. But there are disadvantages which have not yet been overcome. One of these is the uncertainty still existing, in spite of all that has been said to the contrary, of the safety in storing and handling petroleum. Again, no thoroughly satisfactory furnace has yet been devised for burning it. Again there have been reports that as a fuel petroleum is not so efficient as coal, and finally that it is more expensive than coal. These last two reasons, if clearly established, would condemn naphtha fuel.

An article in a recent issue of the Iron Age explains, very clearly, the kind of petroleum fuel that is suited to ships and the methods adopted in using it. The writer has evidently had something to do with the experiments conducted by the navy department. He says:

"In the first place it is well to bear in mind the fact that what is often called kerosene fuel, or naphtha fuel, in speaking of liquid fuel, is neither the one nor the other. These two are inflammable, containing volatile hydrocarbons; and in the second place they emit an odor and when consumed make smoke. The naphtha used by ships in the furnaces of their boilers is the residue or crude petroleum after the volatile oils have been distilled from it, the kerosene, benzine and other derivatives with low ignition points having been expelled; it is deodorous and can be burned without making smoke. This residuum is a yellowish brown, thick, oily liquid, resembling somewhat light colored molasses. It is perfectly non-inflammable up to 350 degrees, can be carried safely in large quantities, does not deteriorate by being stored or exposed, does not evaporate, and is not detrimental to metal tanks or to the inside of the skin of a ship. The name of this petroleum fuel is residuum, or astaki, naphtha fuel, or mazut; perhaps the last is the one most commonly used to designate this liquid fuel. A Russian report states that mazut can not be set on fire by burning substances thrown on its surface; even when drops of molten metal are dropped into it inflammation occurs only around the stream of metal, and when the drops disappear below the surface of the fluid the fire is extinguished. Firing into the residuum with bursting shells does not ignite it. In order to consume the whole it is necessary to raise the entire mass to its ignition temperature; without contact with flame, this produces evaporation. Liquid fuel is extensively used in steamers plying on the Caspian sea and in locomotives employed near that region. Of course, the whole country thereabouts being an oil well, the naphtha is cheap and very easy to obtain, and the conditions governing its use are far different from those which hold in other portions of the world under different circumstances. Russia, therefore, has had more practical experience in the use of liquid fuel than any other country. She has further made the most extensive experiments in the burning of petroleum fuel in war ships, and especially in torpedo boats, where the success has been sufficiently marked to decide the government to use it almost entirely in this small craft and to some extent in their coast defense vessels.

"In our country the use of liquid fuel was attempted experimentally last year in a small torpedo boat, and the results, all things considered, were in the main quite satisfactory. Such, too, has been the reported experience everywhere, for all naval powers have experimented more or less with liquid fuel. Italy has adopted petroleum fuel for use in her torpedo boats, and is introducing it as an auxiliary fuel in some of her larger vessels. Germany has also decided to supply it to her torpedo boats and has constructed large reservoirs at Wilhelmshaven for its storage. France has made many attempts looking to its employment, though she has not yet definitely adopted it.

"Many different ways of using petroleum fuel have been put to the test and have been found wanting in some particular. It should be stated, however, that since in nearly every case the boiler to be fired with residuum was one which was originally designed to be fired with coal, undoubtedly many drawbacks resulted from this cause. Again, the boiler and steam fittings were for controlling the ordinary feed water, drafts, etc., common to all coal burning furnaces, and these makeshifts must have interferred, more or less, with the success of the experiments. The method which has been most experimented with, and which has given most satisfactory results, is that in which the oil is sprayed into the furnaces by means of steam or air blasts. This method has in fact, superseded the other methods. The primary question to be settled is whether in order to pulverize the naphtha fuel it is better to make use of air or of steam. The objection urged against the use of air is the amount of space the compressors would occupy in the vessel and their weight. On the other hand, the objection raised against the employment of steam is that an undue quantity of it would have to be constantly supplied to overcome that which must be unavoidably lost by escape, no condensers having yet been devised capable of supplying this loss.

"In the equipment for burning liquid fuel fitted to the Maine's torpedo boat, fire bricks partially grooved across one face were laid on the ordinary gratebars at an angle of 45 degrees, thereby forming air ducts over the entire surface of this corrugated bed. The liquid fuel was distributed over this bed in a fan shaped spray and was there heated to incandescence, the air passing through the grooves and uniting with the gases of the oil spray, making a perfect oxyhydrogen flame. The pulverization of the oil was effected by compressed air. In the Russian experiments, which were more thorough and comprehensive than those made in our country, the torpedo boat Wiborg was used and steam was employed for breaking up the liquid fuel, a specially designed evaporator giving highly satisfactory results. In firing with naphtha fuel in Russia, using steam as a pulverizer, the steam entered the burner at a pressure greater than forty-five pounds, and, passing into the furnace, was dispersed; upon its exit it met the stream of naphtha, pulverized it, and the mixture of steam, naphtha dust and air burned."

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes, May 22, 1897:

	Wheat, bushels.	Corn, bushels.
Chicago	6,208,000	4,857,000
Duluth	4,262,000	8,000
Milwaukee	170,000	3,000
Detroit	76,000	1,000
Toledo	829,000	223,000
Buffalo	625,000	214,000
	12,170,000	5,306,000

As compared with a week ago, the above figures show, at the several points named, a decrease of 1,214,000 bushels of wheat and 1,254,000 bushels of corn.

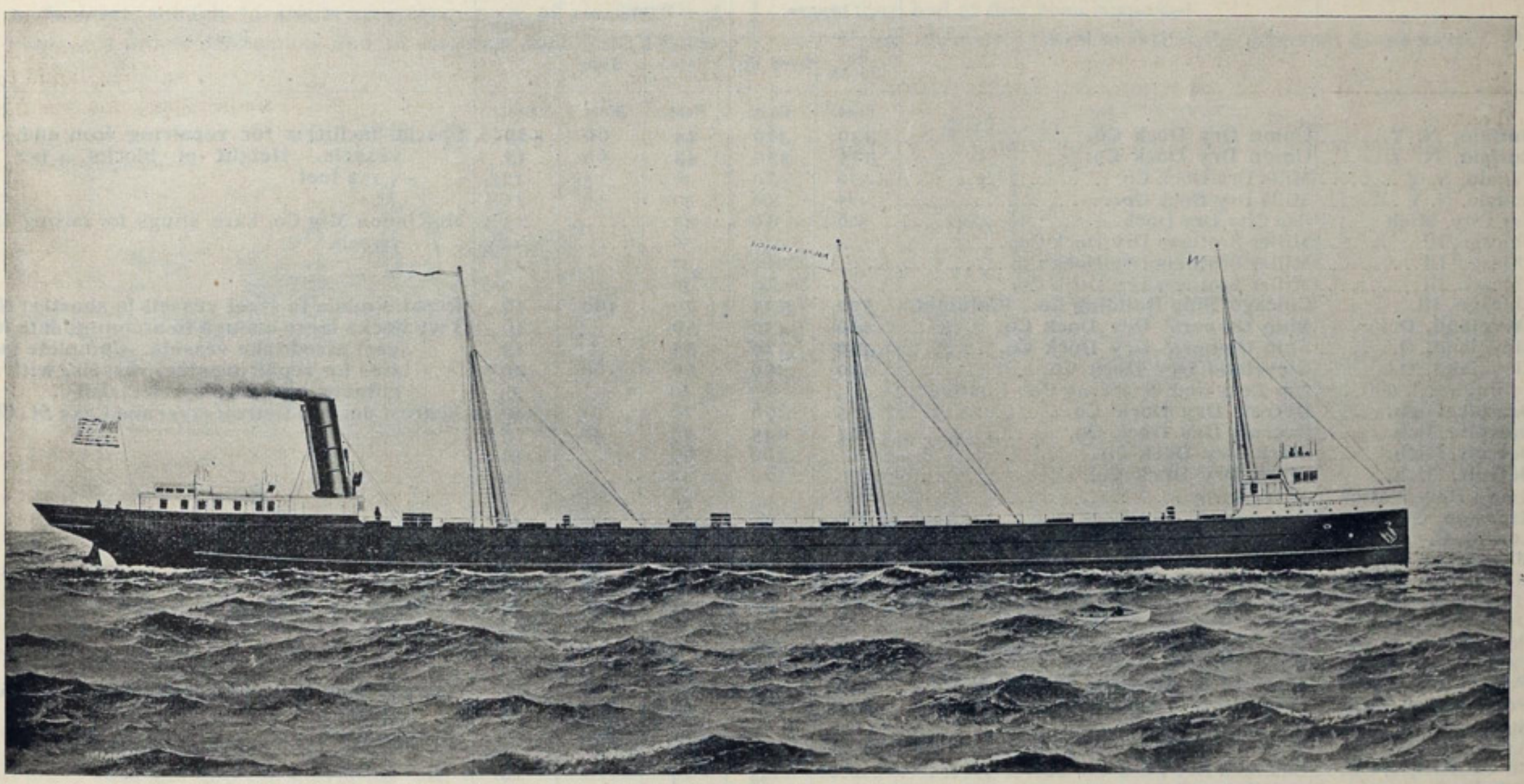
Within the past three years, lake vessels to the number of twenty-nine have been fitted with steam towing machines, all of the type made by the American Ship Windlass Co. of Providence, R. I. The list includes the steamers Aurora, Italia, Bulgaria and Caledonia, owned by John and James Corrigan of Cleveland; steel tow barges Martha, Malta, Manda, Marcia and Magna owned by the Minnesota Steamship Co. of Cleveland; steel barge Constitution, owned by the Interlake Co., Cleveland; steamers Rappahannock and Sacramento, owned by James Davidson, West Bay City, Mich; car ferry barges Nos. 1 and 2, owned by Lake Michigan Car Ferry Transporation Co., Chicago; steel oil barges Nos. 58 and 81, owned by Standard Oil Co.; steel tow barges Tyrone and Antrim, owned by American Transportation Co. of Fairport, O.; steel barge Geo. E. Hartnell, owned by Northwestern Transportation Co., Detroit; steel barge Carrington, owned by C. W. Elphicke & Co., Chicago, and steel barges Alex. Holley, James Nasmyth, Sir Isaac Lothian Bell, Geo. H. Corliss, Alfred Krupp, W. LeBaron Jenney and Sidney G. Thomas, owned by Bessemer Steamship Co. of Cleveland.

Greatest of the Lake Superior Ore Mines.

Machinery now at the big Mountain Iron mine (Rockefeller—Carnegie property) on the Mesabi range, where iron ore is mined at a cost of about 7 cents a ton, consists of two Marion and two Vulcan steam shovels, one of the latter being a new machine that has not been tried in ore, but is guaranteed to mine 5,000 tons every ten hours. It is one of the finest pieces of machinery on the range. The mine has twenty-three acres of ore stripped for mining, but two of the shovels are steadily at work increasing this stripped area and will probably so continue all summer. The length of the ore body uncovered is a little over one-half mile and the width about 500 feet in the widest part, while the depth of the ore so far cut into the levels for the shovels and tracks is about 60 feet, with the ore extending how much below that nobody but the company knows. It is generally supposed that the ore body is about 1,200 feet in width in the widest parts and that the ore runs down some 100 feet to 150 feet. The present pit represents about 1,000,000 yards of stripping and some 1,250,000 tons of ore has been taken out since the spring of 1893. There are two ore levels on the east side of the mine and one on the west. These levels run parallel, the two on the east side being one above the other, and they are so situated that three trains of twenty-five to thirty cars of ore may be loaded simultaneously, one on each side of the mine from the upper levels and one on the lower level. It is herein that the mine has a decided avantage over any other open pit property, for the trains can be brought to the mine and moved alongside the shovels and on out without shifting. The railroad track over which the empties are brought in for ore lies to the west side of the mine, and runs parallel with it its full length. At the extreme north end switches are so arranged that cars may be run to either side of the property for loading in the upper levels or to the lower level on the east side. At the south end tracks are laid continuously and loaded cars are transferred without delay to the railroad yards one-half mile below. As soon as one train load of empties is loaded with ore another is brought in back of it, and there is no delay from extra switching or from backing out, and the shovels need not stand idle. The tracks are so laid that ore may be taken out for a distance of half a mile before it is necessary to remove the cars, and the trains make one circle, coming in from the north empty and going out at the south loaded without any unnecessary moving or delay. By putting one shovel on each of the three levels this mine could easily put out ore for this season to the amount of from 12,000 to 13,000 tons a day or about four times its present output, and still the stripping could be kept ahead of the shovels in ore. But of course there is no intention of doing any such work. The new ninety-ton shovel is an immense machine. Its frame consists of six 15-inch I-beams, each 36 feet long, and combined they weigh about seven tons. For the hoist there are a pair of 13 by 15-inch engines. A pair of 7 by 9 engines swing the crane, and the hoisting and swing chains are of 1⅜ and 1¼-inch best quality dredge chain. The dipper has another pair of 7 by 9 engines. The shovel will handle about eighteen tons of material a minute without crowding.

Our Young Naval Constructors.

As England declines to further extend the courtesies of her institutions for the education of naval architects to American pupils, the graduates of the naval academy must hereafter be educated at home. Lately England has refused to permit the cadets at Glasgow to inspect her leading ship yards or to receive any information whatever of a technical nature. The refusal to grant these courtesies is said to have been due to jealousy at the high stand taken by the Americans over her own men at the various schools, and especially at Greenwich. In all instances the American lads have taken the highest honors of their class, and in competition, too, with men their seniors by many years. Of perhaps twenty boys sent from the naval academy to these foreign schools, all are now members of the construction corps, save five who are dead, and one, Lewis Nixon, who is at the head of a ship building plant at Elizabethport, N. J. Eight cadets are now taking the course abroad, five of whom have already been commissioned assistant naval constructors, and three will return home in June and be assigned to the corps. These young men are being educated at Glasgow and at Paris.



STEEL STEAMER ANDREW CARNEGIE, OWNED BY WILSON TRANSIT CO., CLEVELAND.

Dimensions: Over all, 420 feet; keel, 400 feet; beam, 48 feet; depth, 28 feet. Largest cargo, 182,760 bushels of wheat, equal to 5,482 net tons, on draft of 16 feet 1 inch.

It is announced from Ottawa that the contract for the fast Atlantic steamship service made with Peterson, Tate & Co. of Newcastle has been practically settled. Canada is to pay an annual subsidy of $500,000 for ten years. The British government is to pay $250,000 yearly. The Dominion government has only been waiting for the consent of the imperial authorities, which has now been received. The speed is to be equal to 500 knots in twenty-four hours. There is to be provision for cold storage, and in every respect the vessels are to be up to the best standard. Four ships will be ready by 1898.

The Marine Review has prepared in neat oak frames cards containing the schedule of time required to be run between certain points in the St. Mary's river under the speed limit of seven miles an hour. When hung in a pilot house, distance and time may be readily noted from these cards, as the type is large. They will be sent by express to any address at $1 each, or may be had upon application at 409 Perry-Payne building, Cleveland, for 65 cents each.

Coast and Lake Engineers.

Editor Marine Review:—I noticed in the marine news of the Evening News of this city several days ago a statement that a gang of Italians had been shipped to Duluth to fire the boilers in the steamer North Land, and a little later another gang of Spaniards was sent up as stokers for the North West. It stated that they were procured for the reason that they had seen service on the Atlantic liners, making it appear somewhat to the general public that salt water men were superior to lake men. For several years past whenever a man from the coast was engaged to fill a position on the lakes, the papers always mentioned the fact that these men had seen service on the ocean or had been on some coaster, causing people to think that we were a four-card flush as compared to them with regard to our ability. When the Owego and Chemung came out the owners hired two salt water men, and allowed a larger crew than the steamers have had since then. When they changed, two lake men, W. L. Webster and Wm. Skelton, were hired. They made, with a smaller crew, a great deal better time than the former engineers, running as fast on a regular run as they did doing their best.

The Detroit and Cleveland line used to get men from the coast to fit out their steamers in the spring, but their engineers have since proven that their ability is sufficient to compete with the men from the coast. It can not be shown in a single instance where a salt water man has done as good work or proven as satisfactory as lake men, or frog-pond sailors as we are known on the coast. Our boats are not quite so large, nor do they draw so much water as some of the trans-atlantic liners, because we haven't the room to handle them in our harbors. But the machinery in our steamers is as large, or in some cases larger, than that in the coast steamers, and as we get our cargoes in from ten to twenty-four hours, we do not have one-fourth the time coast engineers do to keep their machinery in shape. We have accidents but we do not lay around in a sea-way several days repairing them. Therefore the lake engineer may be considered just as brainy as his brother from the coast, and by his experience better fitted to cope with difficulties peculiar to lake navigation. The coast engineer no doubt knows how to get through salt water better than the fresh water engineer. Every man to his own trade!

Detroit, Mich., May 21, 1897 John L. Simmons,

Note.—Referring to correspondence last fall with reference to difficulty in the fire-rooms of the Northern line passenger ships, it would seem that the ability of lake firemen or engineers was not questioned. With the firemen insubordination seemed to be the trouble, and the engineers ackowledged that it was impossible to make the firemen stoke according to instructions. The Northern company evidently preferred lake engineers and firemen for they employed them two years, and certainly they can not be blamed for making an experiment with coast men to determine whether or not Belleville boilers can be used on the lakes to advantage. If accounts of the stubborness of the ordinary lake fireman are true, then lake engineers will certainly be glad to see the coast engineers establish discipline in the fire-rooms of the North Land and North West, as it may be the entering wedge of a reform that the lake engineers will carry on to a successful completion. The most unfortunate part of it is the employment of foreigners in good positions when so many able-bodied Americans are looking, or are claiming to be looking, for work.—Editor.

From a Veteran.

Editor Marine Review:—The article about river tugs in the last issue of the Review recalls days gone by, and was to me a great treat, as I was among the tug fleet of "sharks," only a few of whom now answer roll call here. Things are different with the masters of today, who have range lights for every bend, to enable them to run the rivers at night. In the near future, if fortunes gales don't head me off on every stretch, I will try to give you a short story of early days on the lakes, and will try to make it interesting to some of the old "barnacles" who commanded our lake vessels when channels and headlands were not marked and staked out by light-houses, gas and spar buoys, etc. The story of the Fenian scare if fully told would prove amusing. I expect to visit Cleveland and "bunk in" with "Tom" Coe ere long, and will try to see you. May fair winds and following seas be the Marine Review's luck until you cross over; then if your reckonings are right, a bright light will show you a safe landing place on the other side.

Detroit House of Correction, Joseph Nicholson.
Detroit, Mich., May 22, 1897.

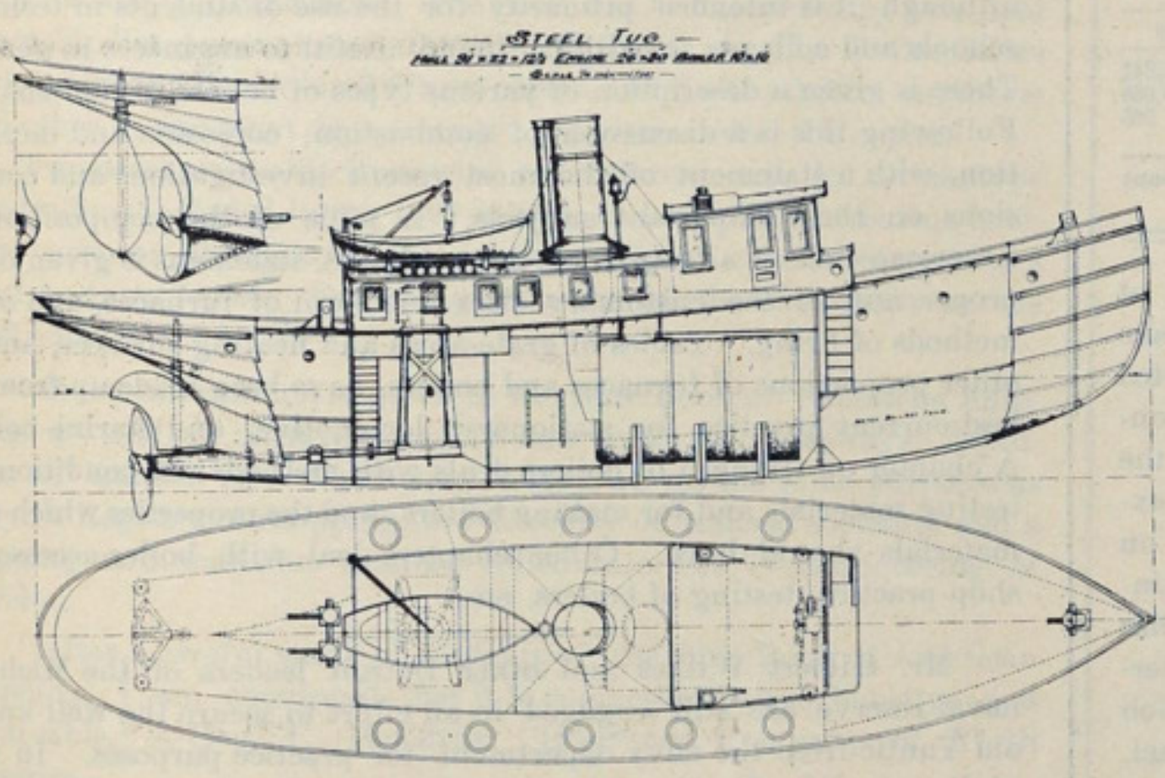
DRY DOCKS OF THE GREAT LAKES.

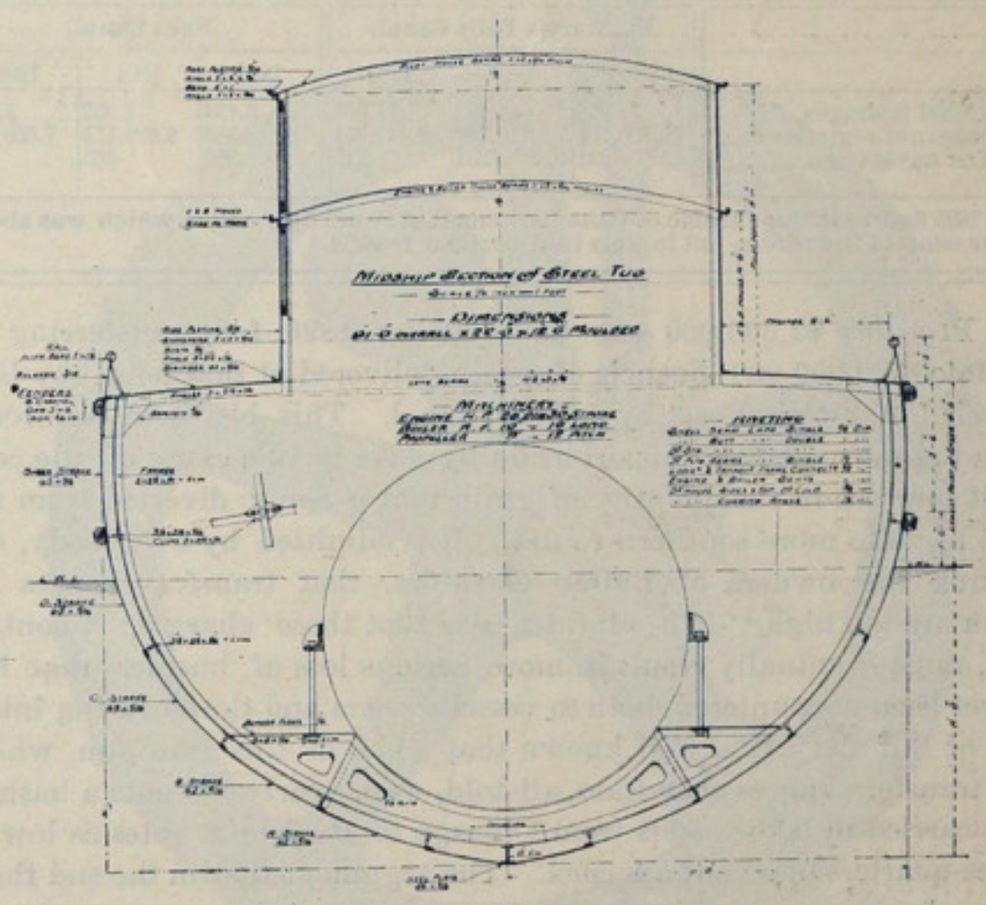
Place.	Name of Dock.	Length.		Width.		Depth over Sill.	Remarks.
		On blocks.	Over all.	Gate.	Top.		
		Feet.	Feet.	Feet.	Feet.	Feet.	
Buffalo, N. Y.	**Union Dry Dock Co.**	**330**	**360**	**44**	**60**	**15**	**Special facilities for repairing iron and steel vessels. Height of blocks 4 1-2 and 5 1-2 feet.**
Buffalo, N. Y.	**Union Dry Dock Co.**	**325**	**350**	**43**	**60**	**13**	
Buffalo, N. Y	Mills Dry Dock Co.	370	380	46	75	12½	
Buffalo, N. Y	Mills Dry Dock Co.	285	290	40	60	11½	
Bay City, Mich	Bay City Dry Dock	306	316	42	------	13½	McKinnon Mfg Co. have slings for raising small vessels.
Chicago, Ill	Miller Brothers Dry Dock Co.	------	310	50	------	14	
Chicago, Ill	Miller Brothers Dry Dock Co.	------	280	42	------	12	
Chicago, Ill	Miller Brothers Dry Dock Co.	------	260	40	------	9	
Chicago, Ill.	**Chicago Ship Building Co. (Calumet.)**	**500**	**525**	**70**	**100**	**16**	**Repairs made to steel vessels in shortest time.**
Cleveland, O.	**Ship Owners' Dry Dock Co.**	**430**	**450**	**50**	------	**16**	**Two docks large enough to accommodate largest sized lake vessels. Complete facilities for repairing steel vessels, with machinery operated by electricity.**
Cleveland, O.	**Ship Owners' Dry Dock Co.**	**300**	**320**	**55**	------	**13**	
Cleveland, O.	**Cleveland Dry Dock Co.**	**340**	**360**	**50**	**88**	**20**	
Collingwood, Ont	Dry Dock and Wrecking Co., Limited	------	325	50	------	15	
Detroit, Mich.	**Detroit Dry Dock Co.**	**365**	**378**	**78**	**91**	**16**	**Nearest dock to Detroit river and Lake St. Clair.**
Detroit, Mich.	**Detroit Dry Dock Co.**	**245**	**245**	**48**	**48**	**8¼**	
Detroit, Mich.	**Clark Dry Dock Co.**	------	**360**	**66**	------	**10**	
Detroit, Mich.	**Clark Dry Dock Co.**	------	**220**	**42**	------	**10**	
Grand Haven, Mich	T. W. Kirby	140	------	42	------	8	
Kingston, Ont	Government Dry Dock	280	280	55	79	16	
Lorain, O.	**Cleveland Ship Building Co.**	**545**	**560**	**66**	**102**	**17**	**Largest dock on the Great Lakes.**
Manitowoc, Wis	Manitowoc Dry Dock Co.	340	350	44	60	12½	
Milwaukee, Wis	Milwaukee Dry Dock Co.	450	460	56	72	16	
Milwaukee, Wis	Milwaukee Dry Dock Co.	312	312	45	75	15½	Facilities for repairing steel vessels.
Owen Sound, Ont	Polson Iron Works Co.	------	300	55	------	12	
Port Dalhousie, Ont	Muir Brothers	255	260	46	100	10½	
Port Huron, Mich	Wolverine Dry Dock Co.	195	210	32	36	13	
Port Huron, Mich.	**Dunford & Alverson Dry Dock Co**	**392**	**412**	**62**	**95**	**18**	**Nearest dock to Straits of Mackinaw and Sault river.**
Port Huron, Mich.	**Dunford & Alverson Dry Dock Co**	**255**	**270**	**50**	------	**6**	
Sturgeon Bay, Wis	Rieboldt, Wolter & Co.	225	------	------	------	12	Floating dock.
Sandusky, O	S. C. Wheeler	140	160	40	------	8½	
St. Catherines, Ont	Shicluna Dry Dock Co.	------	145	24	------	9	
Toledo, O	A. Gilmore & Sons	230	230	37	55	9	
Toledo, O.	**Craig Ship Building Co.**	**450**	**425**	**55**	**110**	**16**	**Available for largest size of lake vessels.**
West Superior, Wis.	**American Steel Barge Co.**	**500**	**537**	**50**	**90**	**18**	**Only dock on Lake Superior.**

Appointments of captains and engineers for 1897, vest pocket size, $1.00. Order from the Marine Review, Cleveland, Ohio.

Longitudinal Framed Steel Tug.

The midship section and outboard plans of a tug illustrated herewith were made some time ago by Robert Curr of Cleveland, and Robert Clark, now of San Francisco, for the L. P. & J. A. Smith Co. of Cleveland. Dimensions of the vessel are 91 feet over all, 22 feet beam and 12 feet 6 inches depth. The longitudinal frames run from stem to stern and there are a sufficient number of transverse frames to keep the vessel in ship-shape crosswise. The longitudinal frames are cut at the transverse bulkheads and bracketed to same with a number of rivets equal to the frame section, thus making a connection equal to a continuous frame. Shell plating is so arranged that the strakes may be ordered of a width equal to the distance between frames and the lapping on same. By this arangement the builder would be enabled to keep the outside plating fair without the trouble and expense usually experienced with light plated vessels. Very little fairing up on the floor would be needed, according to this method, as the shape of the longitudinal frame can be obtained from the plan from a very small scale. The longitudinal frames would need no furnacing, as they stand at right angles to the shell plating and any curve lengthwise could be gotten in at the cold press. The beams are transverse and the deck plating is lapped on them with a view to preventing buckling in the light plates. Deck stringers are arranged to overlap at the ends over the coal scuttles, the lap being of a diamond shape and made large enough to secure an arrangement of riveting that will result in a proper connection and at the same time form a doubling to compensate for cutting the hole for the scuttle. Bunker bulkheads are of steel and also the shovelling flat, which extends from the fore end of the boiler room to the after end of the engine room. The deck house and pilot house are of steel, the windows being arranged similar to those of the tug L. P. Smith of Cleveland. According to these plans the stem and stern post are done away with, the plates beign simply riveted together and a saving of considerable material there by effected. The entire design of the vessel represents an effort to avoid excessive weight and extra labor in construction, and to secure, at the same time, a tug suited to lake work.





Robert Curr, who designed and built two or three tugs for the firm of L. P. & J. A. Smith, and who has just returned from West Superior, where he represented Pickands, Mather & Co. of Cleveland in the building of the steel barge Constitution, is about to undertake survey work or to represent vessel owners in their dealings with ship builders, whether on repairs or the building of new vessels. He has been connected with lake ship yards at West Superior and Cleveland for several years past, and before coming to this country had a thorough training at the famous works of the Thomsons in Scotland and that of Harland & Wolff in Belfast, Ireland. He may be reached by mail at the Perry-Payne building or through telephone 472.

The King Bridge Co. of Cleveland is building for the Craig Ship Building Co. of Toledo one of their new and improved 5-ton pneumatic traveling cranes for use in the Toledo ship yard.

Unusual Corrosion of Steel Vessels.

Soon after the application of steel in the construction of British coasting steamers, with the consequent diminution of thickness allowable with that highly tenacious material, it was found that the forward part of the bottom of these vessels, from a few feet before the collision bulkhead to about 10 or 12 feet abaft, became, after a few months work at sea, very much more corroded than elsewhere. The countersink points of the rivets were found pitted, the rivets sometimes were loose, and the shell plating was so much set in between consecutive floors as to suggest that the vessel had been ashore. Associated with this phenomenon was a wasting of the lower edges of the outer strakes of plating at the same part of the bottom, and this wasting proceeded at such a rapid rate that, after two or three years service, it had extended to the rivets in the lap of the plate edges. Considered by itself, the setting in of the plating between the floors and the loosening of the rivets attaching it to the frames, seemed to point to a straining effect due to the weight of the large body of water carried in the fore-peak tank for trimming purposes when steaming without cargo. Measures were at once taken for reducing the depth of the fore-peak tank, and for affording a stronger connection between the peak bulkhead and the hull of the vessel. But, despite continued efforts in both directions the mischief still went on, until the wasting of the plate edges and the corrosion of the rivets suggested that some other cause was at work than had at first been suspected.

It was ultimately discovered that the principal cause of the phenomenon was the violent pitching movement of the vessel when driven head to sea in a light condition. For, with the machinery right aft, the vessel necessarily trims by the stern, even with the fore-peak filled with water. Whether the tank be large or small, the pitching motion, when driving head to sea, is a frequent one, and the forward immersion being but small, it follows that the comparatively bluff bow repeatedly rises and falls with a thump on the approaching sea. The relatively thin steel plating was thus, in the course of time, set in between consecutive floors, while the atmospheric air imprisoned between the "luff of the bow" and the sea at every plunge, acted corrosively upon the surface of the plating and the countersunk points of the rivets, and the lower landing edges of the outer strakes, in the same way as it does upon the forward upper edge of a screw propeller blade.

When once the cause of the mischief was discovered, a remedy was speedily found in stiffening and thickening the framing and plating sufficiently to stop the vibratory movement that had loosened the rivets, and to allow a deeper and better countersink for those rivets. Moreover, the imprisonment of air bubbles at the landings, with the consequent wasting by corrosion, was prevented, and the evil was cured. The plating still rusts more readily there than elsewhere, but this is remedied by frequent painting.—J. S. P. Thearle in Cassier's Magazine.

The navy department is furnishing prospective bidders with plans and specifications for the model tank that is to be constructed at the Washington Navy Yard.

MARINE REVIEW

DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, Ohio, by John M. Mulrooney and F. M. Barton.

SUBSCRIPTION—$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, $1.00. Advertising rates on application.

Entered at Cleveland Post Office as Second class Mail Matter.

The books of the United States treasury department on June 30, 1896, contained the names of 3,333 vessels, of 1,324,067.58 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1896, was 383 and their aggregate gross tonnage 711,034.28; the number of vessels of this class owned in all other parts of the country on the same date was 315 and their tonnage 685,204.55, so that more than half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1896, was as follows:

	Number.	Gross Tonnage.
Steam vessels	1,792	924,630.51
Sailing vessels and barges	1,125	354,327.60
Canal boats	416	45,109.47
Total	3,333	1,324,067.58

The gross registered tonnage of the vessels built on the lakes during the past six years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30.	1891	204	111,856 45
" " "	1892	169	45,968.98
" " "	1893	175	99,271.24
" " "	1894	106	41,984.61
" " "	1895	93	36,352.70
" " "	1896	117	108,782.38
Total		864	444,216.36

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (*From Official Reports of Canal Officers.*)

	St. Mary's Falls Canal.			Suez Canal.		
	1895*	1894	1893	1895	1894	1893
No. vessel passages	17,956	14,491	11,008	3,434	3,352	3,341
Tonnage, net registered	16,806,781	13,110,366	9,849,754	8,448,383	8,039,175	7,659,068
Days of navigation	231	234	219	365	365	365

* 1895 figures include traffic of Canadian canal at Sault Ste. Marie, which was about ¼ per cent. of the whole, but largely in American vessels.

Probably $2,500,000 was paid during 1896 for transferring at Buffalo 170,000,000 bushels of grain delivered at that point by lake vessels for shipment east by rail and canal. This big item connected with the movement of export grain by lake is one cause of the constant increase in the quantity of grain that is being diverted from the lake route to more southern routes. It is admitted by everybody, excepting the owners of Buffao elevators, that transfer charges on grain are too high. It is admitted also that these charges, if continued, must eventually result in more serious loss of business than has as yet been encountered, both to vessel owners and the elevating interests of Buffalo. It is well known that some of this grain, on which the transfer charges at Buffalo, all told, were nearly 1½ cents a bushel, was carried in lake vessels from Chicago to Buffalo at rates as low as three-quarters of a cent a bushel. The argument that in the end these reduced charges are of advantage to none but the consumer is not well taken in this case, as all lake interests must be at a great loss on account of competition that diverts the grain to the southern routes above referred to. It is to be hoped, therefore, that new elevators now under way at Buffalo and other points on Lake Erie will bring about a marked reduction in these charges. If such is not the case, the vessel owners of the lakes should make preparations, before the opening of another season, for active opposition to the Buffalo interests that are combined for the maintenance of these exorbitant charges.

A Duluth newspaper correspondent says that Capt. Alex. McDougall first conceived the idea of building vessels of the whaleback type in 1873, fourteen years before his famous barge 101 was put together at the head of the lakes. According to this latest story, the inventor of the whalebacks had no thought of a vessel of that kind until he was sent to England and Scotland by the management of the Anchor line, for whom he had been sailing lake vessels, to obtain such new ideas regarding ship building as he might deem of interest to his employers. While there he examined and studied details in the construction of a cylindrical vessel which was built in Scotland and sent in sections to Alexandria for the purpose of taking the Egyptian obelisk to London. This vessel, it will be remembered, went adrift on the Bay of Biscay, but was finally secured and towed to the Thames. Capt. McDougall considered this vessel a failure, but his investigations led him to believe that it might be possible to construct a vessel in which the advantages sought to be obtained in the "cigar" boat might be secured. On his return to this country, he worked diligently with this end in view, and finally succeedcd in interesting the Colbys, Colgate Hoyt and other New York capitalists to the extent of building the fleet of whalebacks that are now afloat on the lakes.

Prior to the war with China, Japan did not possess a single line-of-battleship, but at the close of that campaign she had a fleet of forty-three serviceable vessels, ten of which had been captured from China, as also twenty-six torpedo boats. She has now mapped out a plan of naval expenditure which is to be carried out during the next ten years. In that time she proposes to build four battleships of 15,000 tons each, four first-class cruisers of 7,500 tons each, three second-class and two third-class cruisers, three torpedo gunboats, eleven torpedo destroyers and eighty-nine torpedo boats. Nor are Japan's dreams of power confined to operations on the sea. At the close of the war her army had a peace footing strength of 70,000 and a war footing strength of 268,000, and the program is that by 1904 the strength of the army in peace shall be 145,000, and on a war footing 520,000. The vast expenditure necessary for this is to be had by using the entire Chinese war indemnity of $300,000,000 and floating a public loan of $120,000,000.

John Wiley & Sons, New York, have recently published a book of nearly 400 pages and 142 illustrations on "Steam Boilers," by Cecil H. Peabody, professor of marine engineering and naval architecture, and Edward F. Miller, assistant professor of steam engineering, both at Massachusetts Institute of Technology. The book deals with methods of designing, making, managing and caring for boilers, and although it is intended primarily for the use of students in technical schools and colleges, it will be found useful to engineers in general. There is given a description of various types of boilers in common use. Following this is a discussion of combustion, corrosion and incrustation, with a statement of the most recent investigations and conclusions on these important subjects. A table of the compositions of American fuels is a feature of the work. A statement is given of the proper and of the customary sizes and form of furnaces, and of the methods of firing. Tables of grate-areas and heating surfaces, and of other proportions of furnaces and boilers, have been made up from the best current practice for stationary, locomotive, and marine boilers. A chapter on strength of boilers deals with methods and conditions for testing materials and for making boilers, and the properties which such materials should have. Other chapters deal with boiler accessories, shop practice, testing of boilers, etc.

Mr. Gilbert Wilkes and other Detroit leaders of the Michigan naval reserve are still engaged in an effort to secure the well-known old Yantic from the navy department for practice purposes. In view of the possible detail of this vessel to the lakes, the secretary of the navy has asked the state department for a construction, in this regard, of the treaty between Great Britain and the United States prohibiting the presence of warships on the lakes. If there is nothing in the treaty prohibiting a vessel of the Yantic's character from entering the lakes, she will very probably be given to the Michigan reserves, provided she can get through the St. Lawrence canals. But in this there is another difficulty, as the Yantic is 180 feet over all, 30 feet beam and 12 feet depth. It is thought that she can not be lightened sufficiently to admit of passage through the lower canals. She is a wooden vessel, built at Philadelphia in 1864. She is bark rigged and has engines of 225 horse power that drive a screw. It is understood that officials of the navy department favor the proposition to loan this vessel to the Michigan organization, but objection will certainly be raised by either Canada or the British government to a war vessel of any kind being moved through the Dominion canals to the lakes.

The action of the management of the Duluth, Mesabi & Northern Ry. in ordering a suspension of all Sunday work at Duluth is commendable, and it is hoped that the time is not far off when there will be no Sunday work on any of the lake docks. Everybody would be benefited by such a rule, even from a business standpoint.

Harland & Wolff of Belfast, who have built all of the White Star line steamers, now have in hand for that company new vessels aggregating 103,000 tons, which will bring the total tonnage of the line up to 259,000, involving an expediture of $27,500,000.

Appointments of captains and engineers for 1897, vest pocket size, $1.00. Order from the Marine Review, Cleveland, Ohio.

Blue Book of American Shipping.

The 1897 Blue Book of American Shipping will be as far superior to any other marine directory as was the 1896 issue. No marine directory has yet been published giving a complete list of coast steam vessels over 100 tons and all sea-giong sailing vessels. This will give the 1897 book a wide circulation on the coast as well as on the lakes, and advertisers will certainly welcome a medium that covers the entire marine interests of the United States, something that could not be done previous to this without employing two or three publications at considerable expense.

In addition to lists of principal American coast and lake steam and sail vessels and owners (over 7,000), there are special lists containing 1,000 names and addresses of concerns that include the principal ship-owning and ship-building interests of the United States; also a list of trans-atlantic lines trading to the United States and Canada, with owners and American agents' addresses. There will be included complete directories of the following marine organizations of the United States: Marine Engineers' Beneficial Association, 4,000 names and addresses; Ship Masters' Association of the Great Lakes and the Association of Masters and Pilots of the U. S., 2,500 names and addresses; Society of Naval Architects and Marine Engineers, 600 names and addresses. In addition to these lists of societies, names and addresses of captains and engineers of principal lake and sea-going vessels not included in the organizations have been secured, and they will make the most complete list of this kind ever published. There is also a classified and a port directory of marine business concerns of the United States. The book has been ordered by principal steamship lines, marine manufacturing concerns, etc. The United States hydrographic office ordered fifteen copies, and United States engineers and other government departments have given orders for copies.

Two coast steamship lines have ordered very artistic chromotype illustrations included in the 1897 edition, and it will be to marine business concerns throughout the country what a city directory is to a local business house. Following are some of the comments on the 1896 edition:

"Much information is given in the Blue Book of American Shipping, as well as most serviceable data as to the waterways, depth, sizes of canals, etc. The book, indeed, serves the same purposes as Lloyd's Registry of Shipping, the directory of learned societies, and a shipping and maritime manual rolled into one."—Engineering of London.

"After a careful study of contents of the Blue Book of American Shipping, I am convinced that it is comprehensive, exhaustive and invaluable."—Geo. L. McCurdy, Insurance Company of North America.

"You will kindly arrange for the work to be sent to me annually on publication."—A. G. Dryhurst, Secretary, Lloyd's Register of British and Foreign Shipping, 2 White Lion Court, Cornhill, London.

"As I have received orders for goods amounting to much more than the expense of the advertisement, I think I am getting off cheaply."—E. A. Bunker, 27-29 William Street, New York.

"Let me congratulate you on having issued a book that cannot help but be of great value to all interested in lake ship building."—H. F. J. Porter, Western Sales Agent, Bethlehem Iron Co.

"It will prove a useful book of reference in my office."—Wm. P. Anderson, Chief Engineer, Department of Marine and Fisheries, Ottawa, Can.

"I find your Blue Book very useful to me."—C. W. Whitney, New York, representing Messrs. John Brown & Co., Sheffield, England.

"The book is both interesting and instructive, and attractive in every way."—Phillip Hichborn, Chief Constructor, United States Navy.

The Office of Naval Intelligence, Washington, ordered a copy. It also received the commendation of Constructor Hichborn.

"We will take the books in stiff binding or in leather—the total number to be fifteen.—United States Hydrographic Office.

"It is very handsome and the information highly valuable."—Hudson River Line, New York and Albany Day Boats.

"Your Blue Book is very handsome and well gotten up."—Laidlaw-Dunn-Gordon Co., Co., Cincinnati, O.

"Unique and beautiful in every respect, and valuable to all concerned."—Foster Engineering Co., Newark, N. J.

"A valuable work of information to any one interested in lake matters."—H. E. Schmuck, Springfield, Mass.

"We find the book is just what we want and a valuable addition to our office."—Erie Oil Co., Erie, Pa.

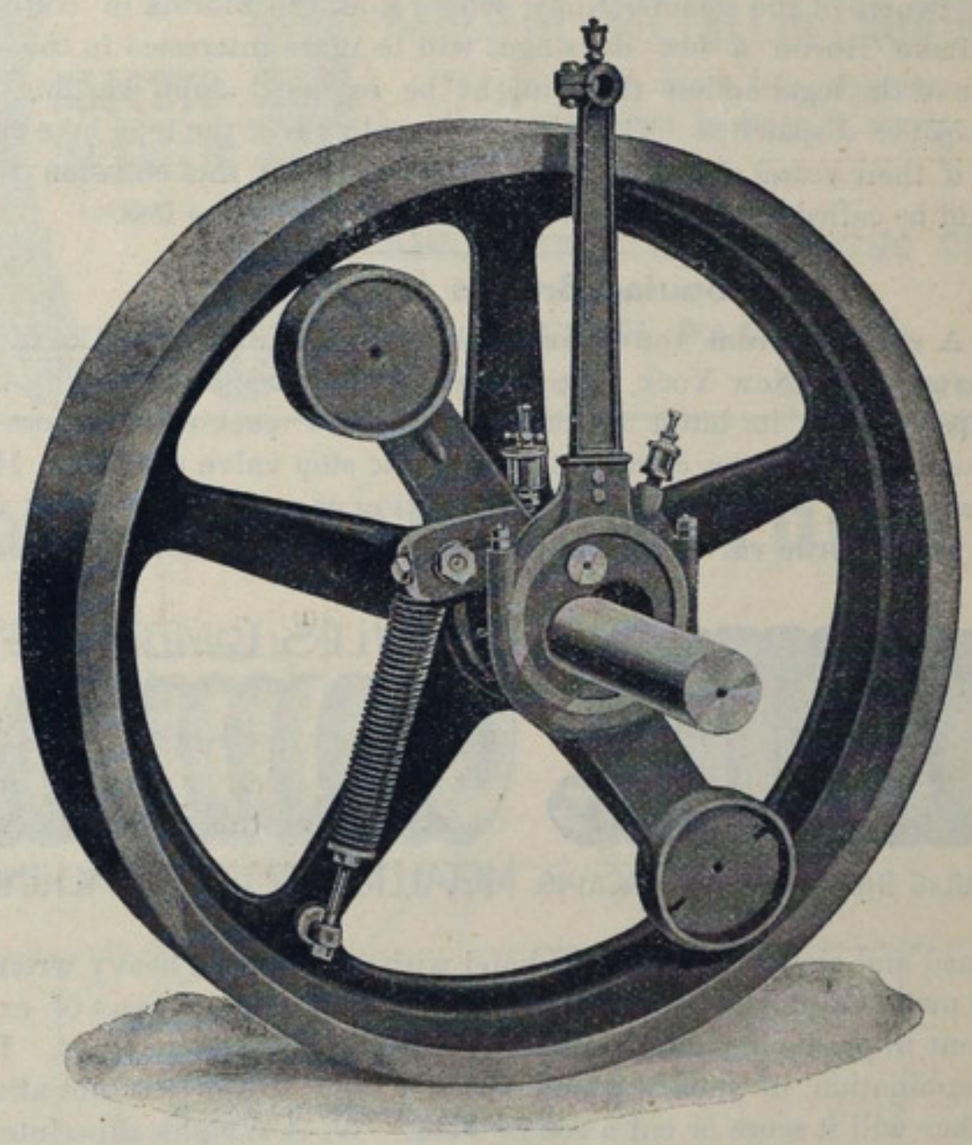
"We think you have given us better notoriety than we specified."—Vulcan Iron Works, Toledo, O.

"We would like to obtain an additional copy of the Blue Book."—New York Maritime Register.

"The best ever put between covers."—J. E. Miller & Son, fuel dealers, Port Huron, Mich.

American Blower Co's New Engine Governor.

A variation of 2 per cent., or even 3 per cent., in the speed of an engine between full load and no load has until recently been considered good regulation, but with the American Blower Co.'s new automatic governor, an illustration of which appears herewith, it is possible to keep the speed almost perfectly uniform, there being a variation of less than 1 per cent. upon throwing the entire load on or off. This fractional variation is so slight and of such short duration as to be



hardly perceptible on a tachometer. In short, the regulation is so perfect that no better results are possible in that direction. The device is a combined inertia and centrifugal governor. Its simplicity will appear by a glance at the illustration, as the governor proper consists of only two pieces—the fly weight and the spring. The eccentric is rigidly attached to the fly weight, without any links or connecting bars whatever. There is no dash pot to get out of order or require refilling with glycerine at frequent intervals. It is absolutely noiseless at any speed, there being no "knock" in starting or stopping, which is common with most automatic governors. These governors are all equipped with a very simple device for changing the spring leverage or centre of gravity, by which means the speed of the engine may be varied nearly 100 per cent., and this without in the least interfering with the regulation. The American Blower Co., Detroit, builds a most complete line of vertical and horizontal high and low pressure engines, the latter being used very extensively in connection with heating plants in buildings where it is desirable to run on from five to fifteen pounds pressure.

Christian Endeavor Excursion to California—Sleeping car reservations are now made from Chicago via all lines, and all information is given for this wonderfully low rate to California at Nickel Plate city ticket office, 189 Superior street, Cleveland. Call early. 71 June 30

Around the Lakes.

Capt. Wm. Turner, treasurer of the Chicago branch of the Ship Masters' Assocation, died at his home in that city Wednesday, aged seventy-five years.

A notice from the Canadian marine department directs attention to the fact that a government dredge is now engaged in removing shoals from Port Colborne harbor.

C. S. Barker, who is engaged on a dredging contract in the Portage lake district, announces that in order to avoid accident, he will furnish tugs, free of charge, to all vessels passing his dredges.

Vessels drawing 16 feet to 10 inches have entered Ashtabula with ore and have reached the ore docks without difficulty. Ashtabula harbor in all its parts is now probably the deepest harbor on Lake Erie.

W. J. Conners' contract for the stewardship of the Western Transit line steamers is said to call for the feeding of the crews at a cost not to exceed 40 cents per day. Managers of some big lines claim to feed their men well at a cost considerably below this figure.

It is expected that the steel lumber steamer Niagara, building at Wheeler & Co's yard, West Bay City, will be launched to-day (Thursday). This is the vessel that will be managed by J. L. Crosthwaite of Buffalo. She will be commanded by Capt. Wm. Lynn, formerly of the steamer Canisteo.

Owners of the steamer Roby, which sank the Florida in collision on Lake Huron a few days ago, will be more interested in the outcome of the legal action than might be expected from reading the newspaper dispatches. Their insurance policy is of the 1896 lake kind, and if their vessel should be held responsible for the collision they would be called upon to bear a considerable part of the loss.

Popular Brands of Packing.

A circular from the Peerless Rubber Manufacturing Co. of 16 Warren street, New York, directs attention to success attained by that company with its latest specialties—Rainbow packing for core or cushion and Hercules combination metallic stop valve packing. Hercules packing is said to be the only packing as yet produced that will stop and throttle valves so that they are perfectly reliable and can be

opened and closed with ease by hand without using a heavy wrench. The metal employed in its manufacture is the result of years of experiment in producing metal especially adapted for this purpose. It is a combination of metals which sulphur and steam will not affect; neither will it score or cut a rod or stem. W. S. Wright, superintendent, and Edgar Williams, chief engineer of the Brush Electric Illuminating Co., New York, unite in sending the Peerless company a very flattering letter of endorsement regarding Hercules packing. "We have used it" they say, "in our stop valves with the most satisfactory results ever obtained from any packing. It is the best packing we have ever used in our stop valves since this plant was established, which is about seventeen years. It keeps the stems absolutely clean, and the valves open and close with perfect ease. Where previously it took a man with a 22-inch wrench to open and close the 10-inch valves, they can now be opened and closed with two fingers, and are perfectly tight."

Trade Notes.

Within the past few days the McKinnon Mfg Co. of Bay City, Mich. has shipped propeller wheels to Manistee, Mich., and to Washington, N. C., and they have had in their slings the barge Jeness, steamer Faxton, tugs Maud S., Tempest and Louise, and the scow J. N. Edson.

Tarr & Wonson, Limited, is the name of a Gloucester, Mass., firm that has a world-wide reputation as manufacturers of paints specially suited to vessels. Their copper paint has the largest sale of any copper paint in the world. Laczone, another specialty, is made in two grades—priming coat and finishing coat—and is especially suited for bottoms of iron and steel vessels. A paint which they have sold quite extensively on the lakes is known as "Racing Compound" and is for bottoms of wooden yachts. It preserves the wood and produces the smoothest sailing surface obtainable.

Capt. H. C. Daggett of the steamship City of Augusta gives the Standard Automatic Releasing Hook Co. of New York, Capt. James R. Raymond, manager, a very flattering testimonial. The circumstances prompting this action show the great value of a reliable device for releasing a life-boat in a seaway. The Mallory line steamer Leona, while on her passage from New York to Galveston, took fire. She was equipped with a full complement of boats fitted with the old fashioned hook and ring. She tried to lower them but experienced considerable difficulty in unhooking them. The City of Augusta from Savannah, Ga., came along and having her boats equipped with the standard automatic releasing hook was enabled without difficulty to lower her boats and take the passengers off and again return them to the Leona when it was considered that she was safe and able to proceed.

TREASURY DEPARTMENT, U. S. LIFE-Saving Service, Washington, D.C., May 22, 1897. Sealed proposals will be received at this office until 2 o'clock, p. m., of Friday, June 4, 1897, for the construction of ten 34-foot self righting and self-bailing lifeboats, with centerboard, six to be delivered in Grand Haven, Michigan, and four on the grounds of the Monmouth Beach Life-Saving Station, near the Galilee Railroad Station, New Jersey. Plans and specifications, together with forms of proposal and full information, can be obtained upon application to the Inspector of Life-Saving Stations, 24 State street, New York City; to the Assistant Inspector 1st and 2d Life-Saving Districts, Room 148, Post Office Building, Boston, Mass.; to the Assistant Inspector 9th and 10th Life-Saving Districts, Custom House, Detroit, Mich.; to the Collector of Customs at Cleveland, Ohio, Philadelphia, Pa., or Baltimore, Md.: or to this office. J. K. UPTON, Acting General Superintendent. May 28

PROPOSALS FOR STEAM TENDERS, MISsissippi River Commission, 2732 Pine Street, St. Louis, Mo., May 25, 1897. Sealed proposals, in triplicate, for construction of three stern-wheel Steam Tenders will be received here until 12 o'clock noon, standard time, June 24, 1897, and then publicly opened. Information furnished on application. H E. WATERMAN, Capt. Engineers, Sec'y, June 18

U. S. ENGINEER OFFICE, TELEPHONE Building, Detroit, Mich., May 10, 1897. Sealed proposals for improving Detroit River, Mich., by removal of Boulders, Bed-rock, or other material from Ballard's Reef Channel, will be received here until 12 o'clock noon (Standard time), June 1, 1897, and then publicly opened. Information furnished on application. G. J. LYDECKER, Lt. Col. Engrs. June 1

TREASURY DEPARTMENT, WASHINGton, D. C., May 19, 1897. Date of sale of the revenue steamer Johnson is changed from May 31st to June 1st. O. L. SPAULDING, Acting Secretary.

The Bessemer Steamship Company

Solicits Catalogues, Prices and Discounts from manufacturers and wholesale dealers in Ship Machinery, Brass Goods, Rope, Paints, Asbestos, Packing, Hose, Furniture, Piping, Glass and Crockery, Tinware, Ranges, Carpeting, Bedding, Life-preservers, Rafts and Boats, Engineers' Supplies and Tools, Carpenters' Tools, Electric Supplies, Lamps, Grate Bars, Castings, etc., etc., etc.

ALSO QUOTATIONS from Market men and Grocers on the Lakes for Provisions and Meat, best quality only.

CATALOGUES without quotations are not wanted.

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Duluth, Minn.

Are prepared to make rates on all classes of Marine Insurance on the great lakes, both CARGOES and HULLS.

"GREAT LAKES REGISTER."
F. D. HERRIMAN, Surveyor-General, Chicago, Ill.

TREASURY DEPARTMENT, WASHINGton, D. C., May 14, 1897. Will be sold at public auction to the highest and best bidder for cash, at 12 o'clock noon on Monday, June 1st, 1897, at the ship-yard of the Globe Iron Works, Cleveland, Ohio, the Revenue Steamer Johnson. The Johnson is a side-wheel steamer of 499 gross tons, fore-and-aft rig; white oak frame; extreme length, 175 feet; beam molded 28 feet 9 inches, draft 7 feet 5 inches forward, 8 feet aft; has a vertical beam engine, one flue and return tubular boiler, built in 1885; and is supplied with steam pump, awnings, anchors and chains, two boats, etc. The vessel can be seen at the place named, and will be open for inspection until the day of sale. A deposit of $200.00 will be required of the successful bidder at time of sale. Will be sold separately at the same time and place certain articles of outfits. The Government reserves the right to reject any or all bids. O. L. SPAULDING, Acting Secretary. June 1

ADVERTISING RATES ON APPLICATION.
COPY OF BOOK AND NAME IN DIRECTORY $5.
BLUE BOOK OF AMERICAN SHIPPING
409 PERRY-PAYNE BLDG. CLEVELAND, O. U.S.A.
CONTAINING PARTICULARS OF ALL THE PRINCIPAL COAST AND LAKE STEAM AND SAIL VESSELS
FOR CIRCULARIZING - ★ LIST OF 1000 NAMES AND ADDRESSES, COVERING THE PRINCIPAL SHIP OWNERS AND BUILDERS OF THE UNITED STATES
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4000 NAMES OF ENGINEERS
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BLUE BOOK

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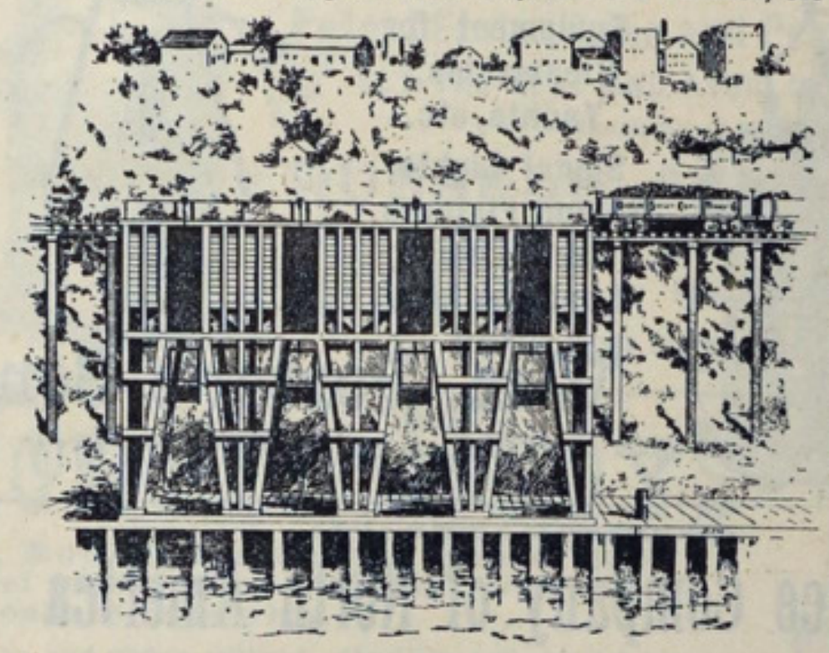

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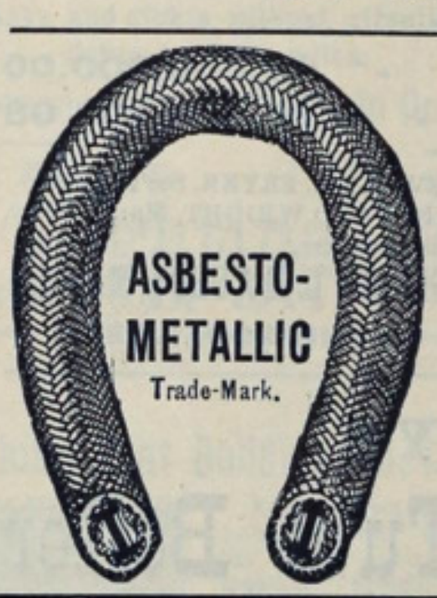

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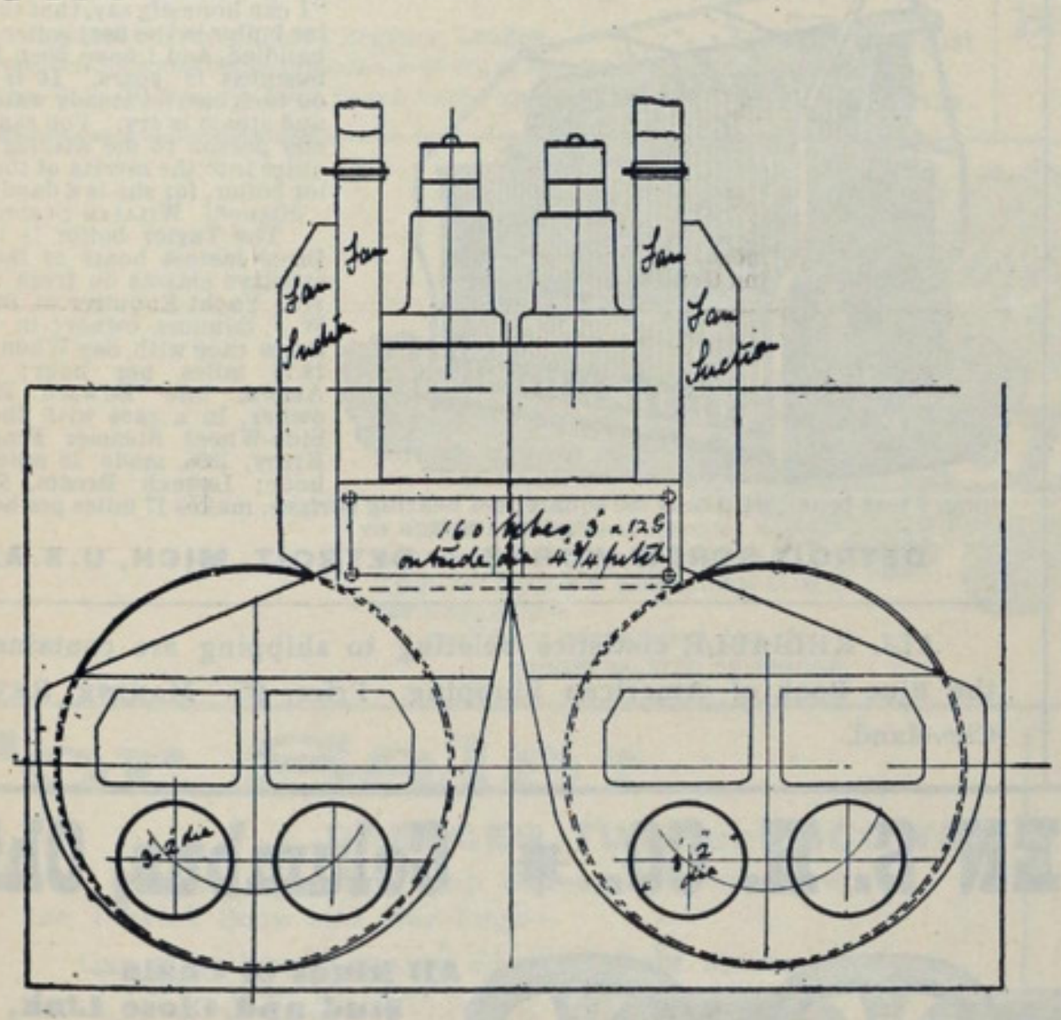

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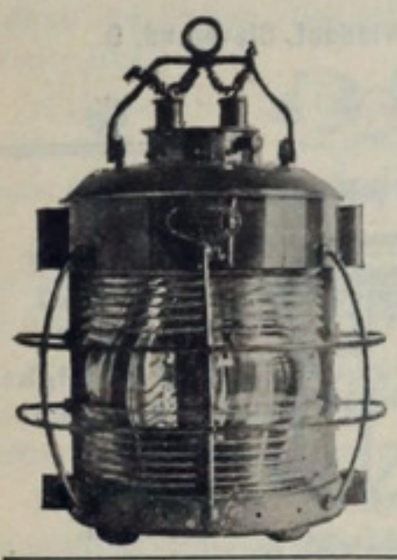

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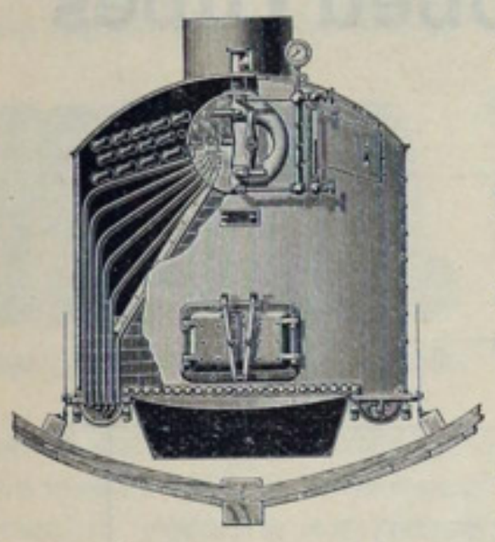

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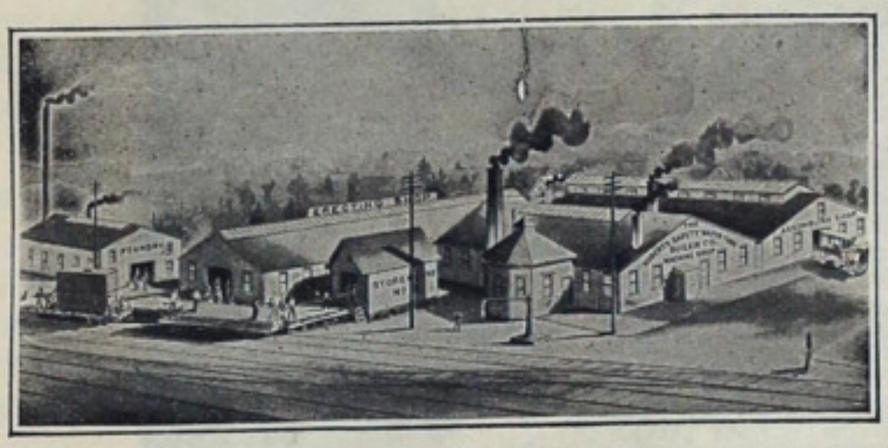

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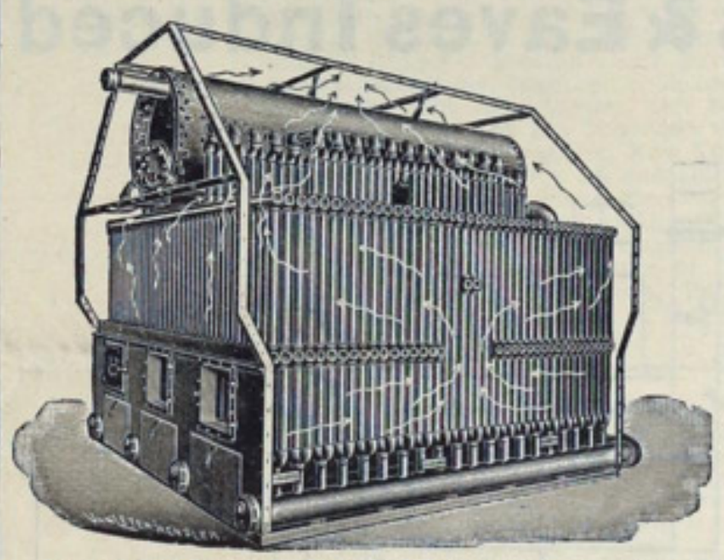

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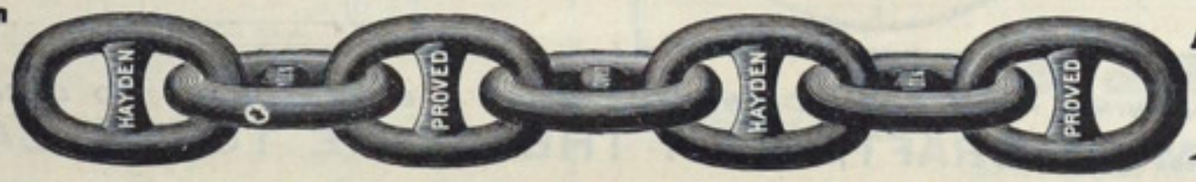

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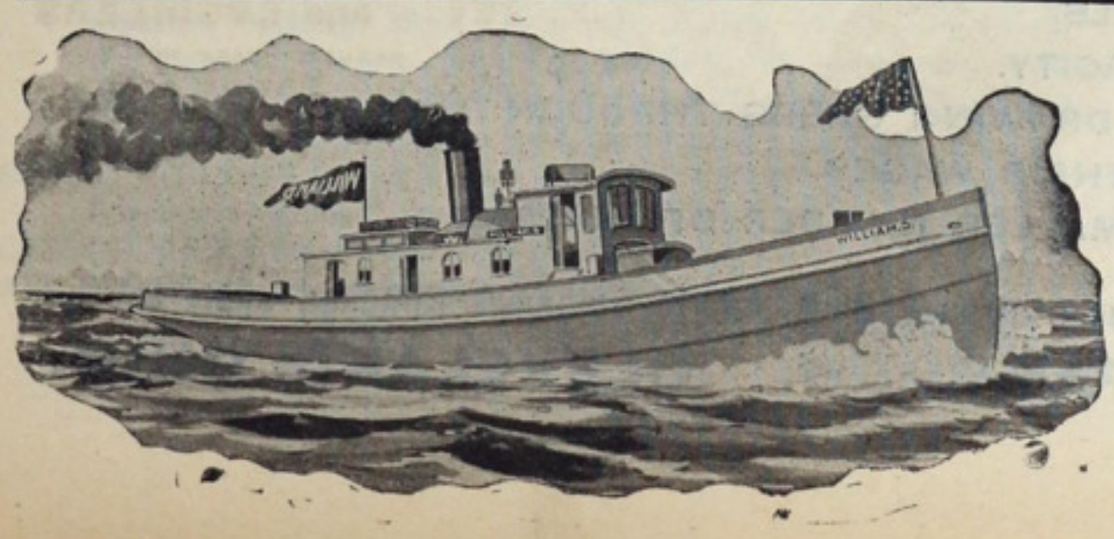

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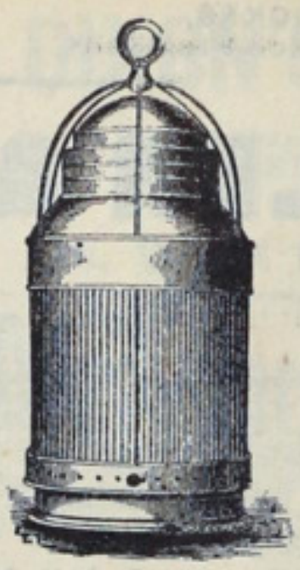

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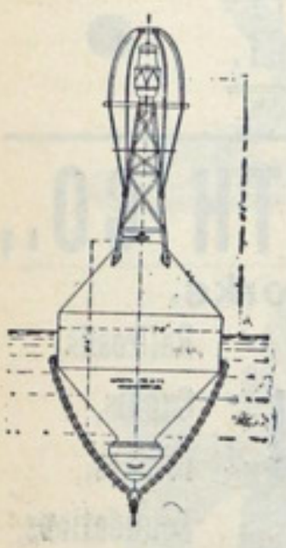

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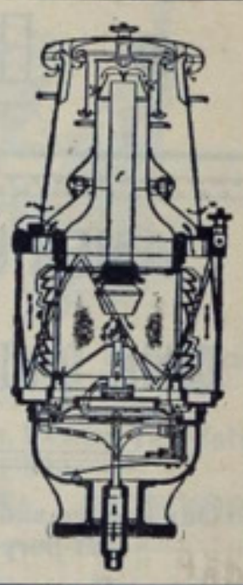

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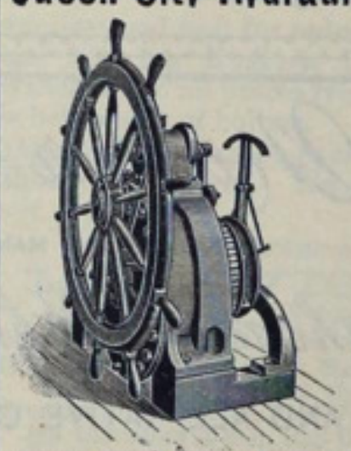

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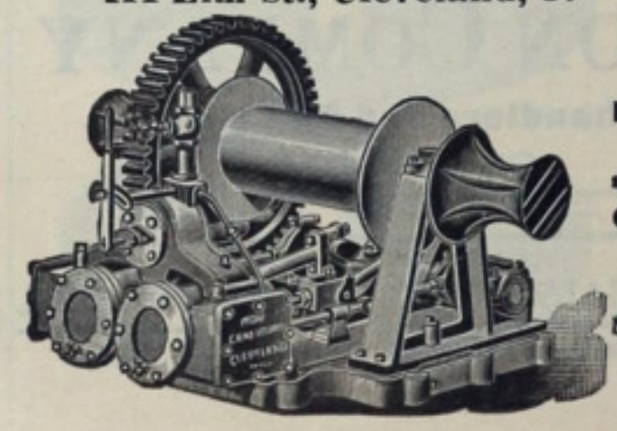

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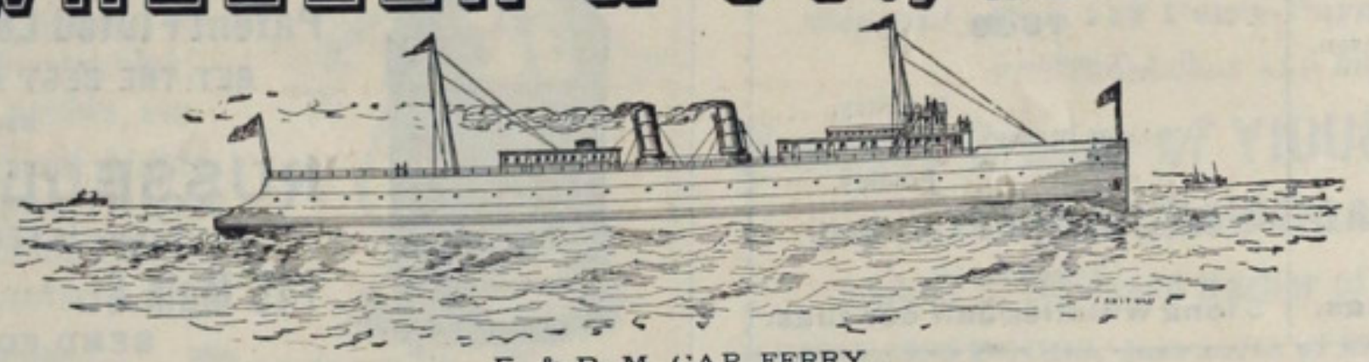

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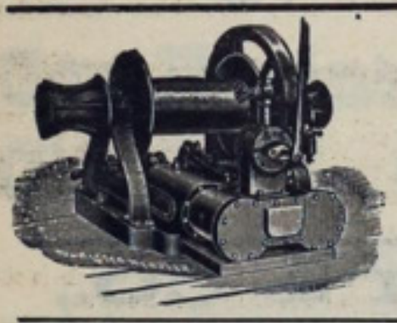

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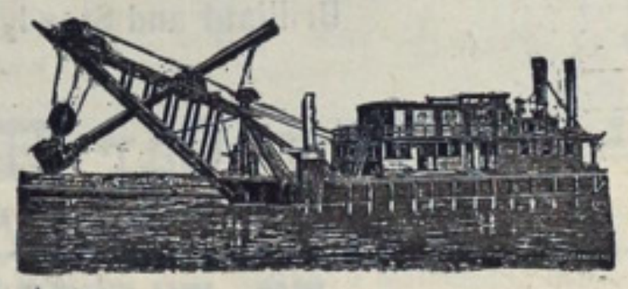

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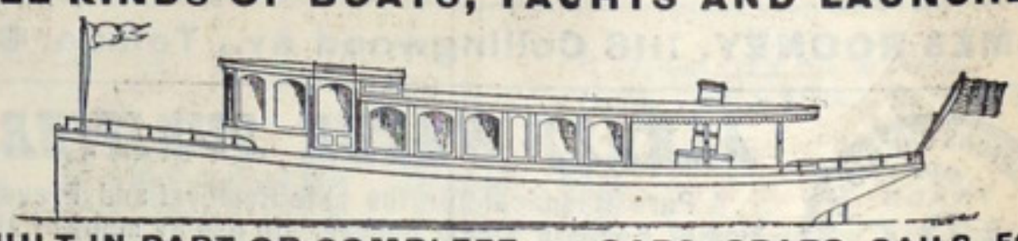

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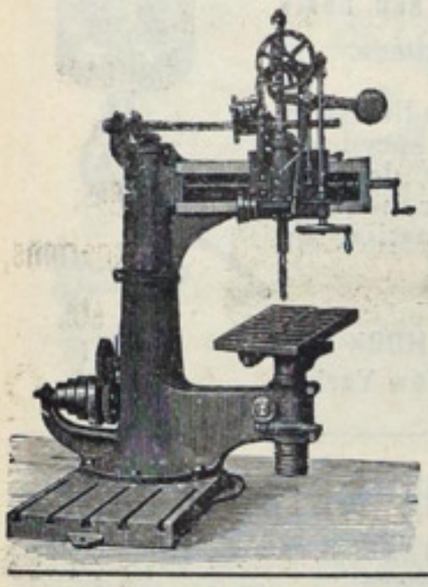

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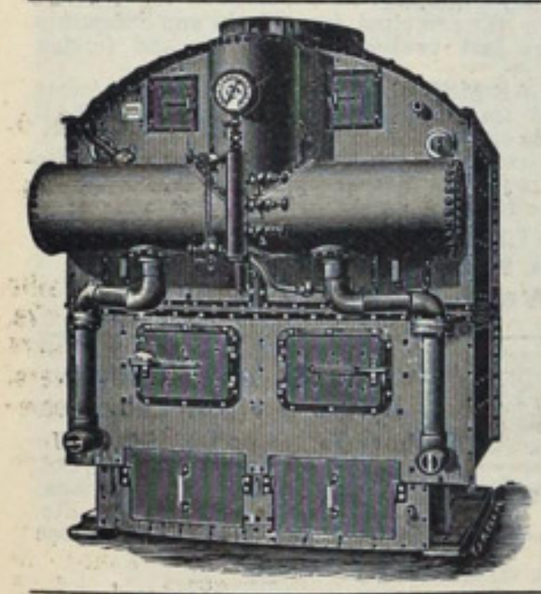

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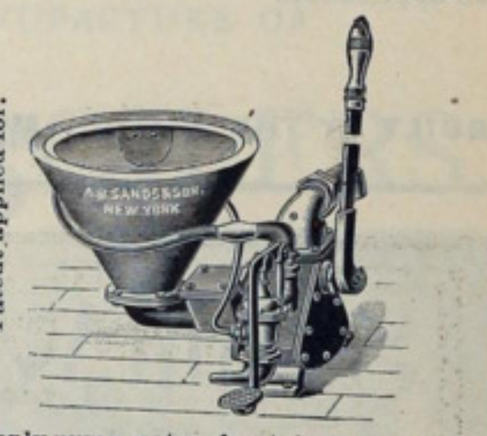

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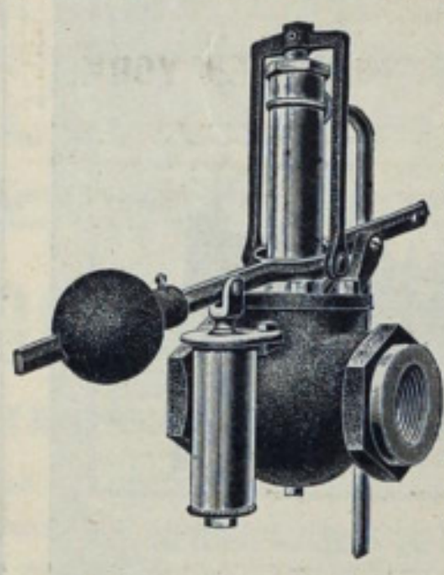

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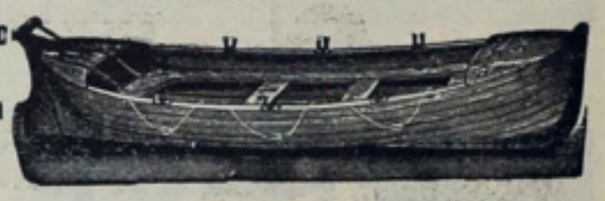

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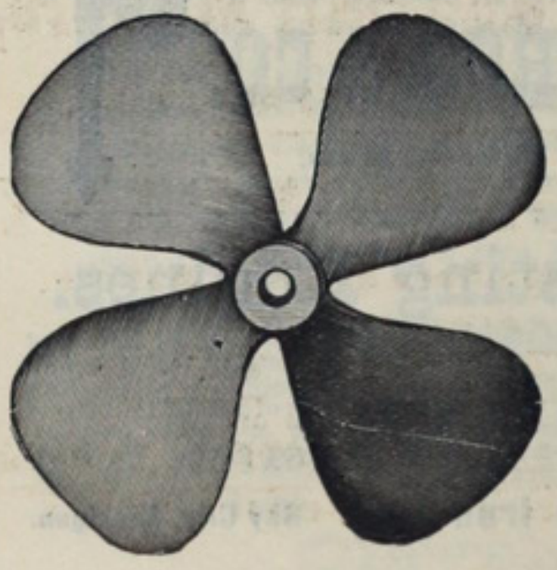

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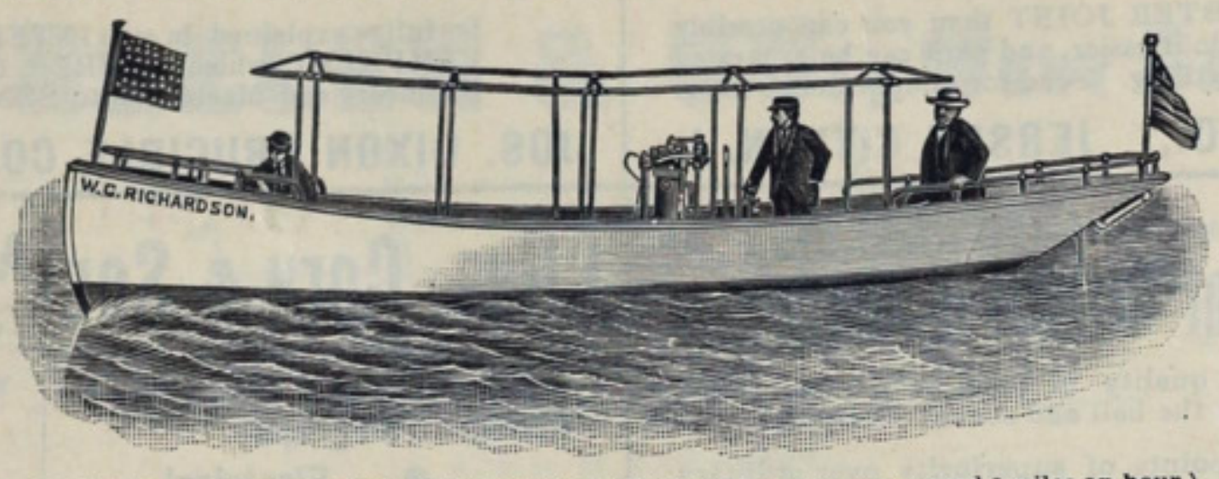

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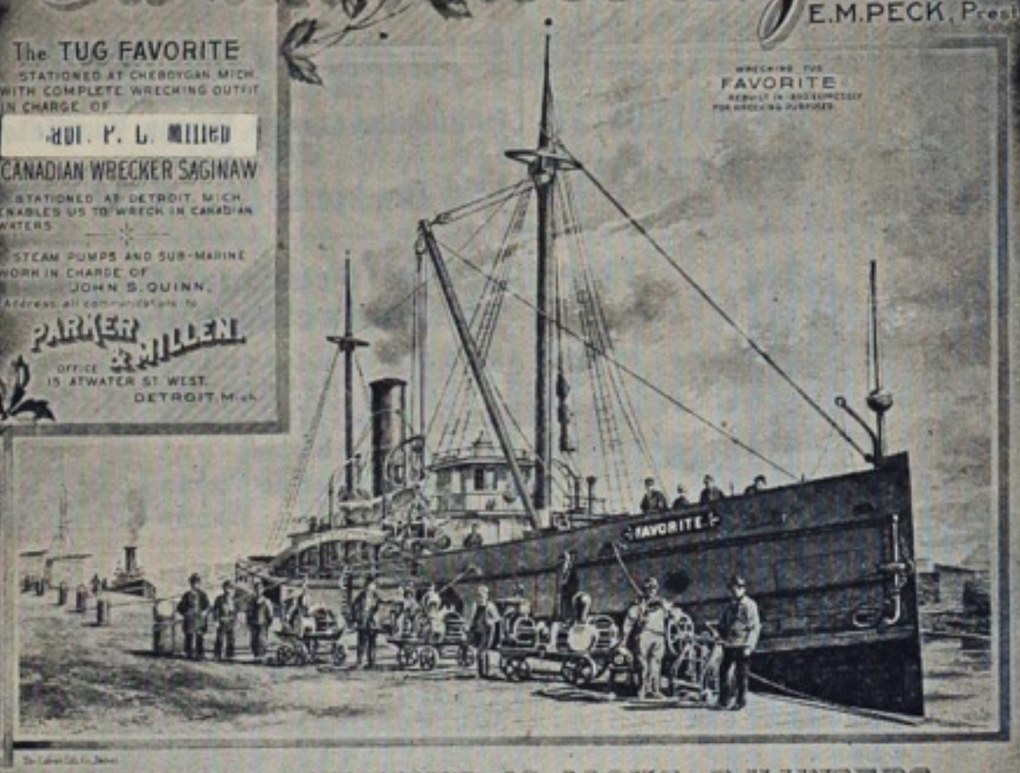

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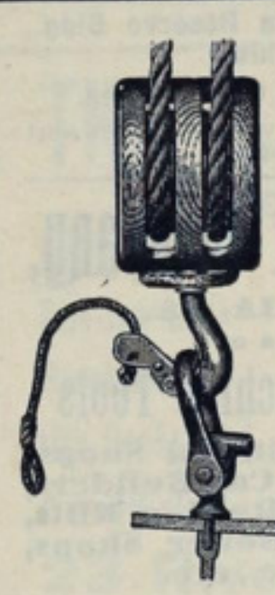

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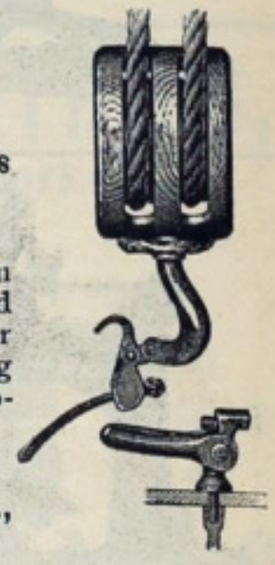

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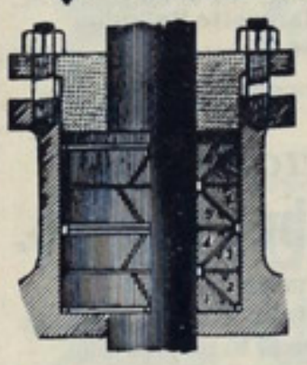

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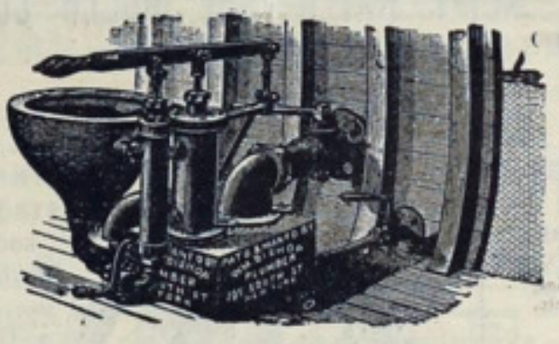

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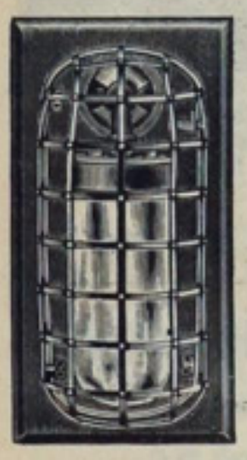

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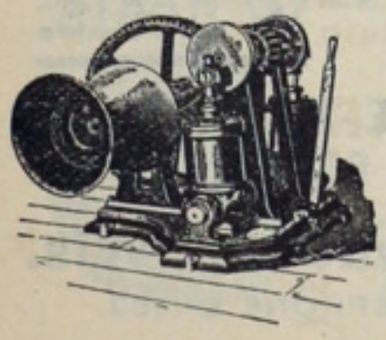

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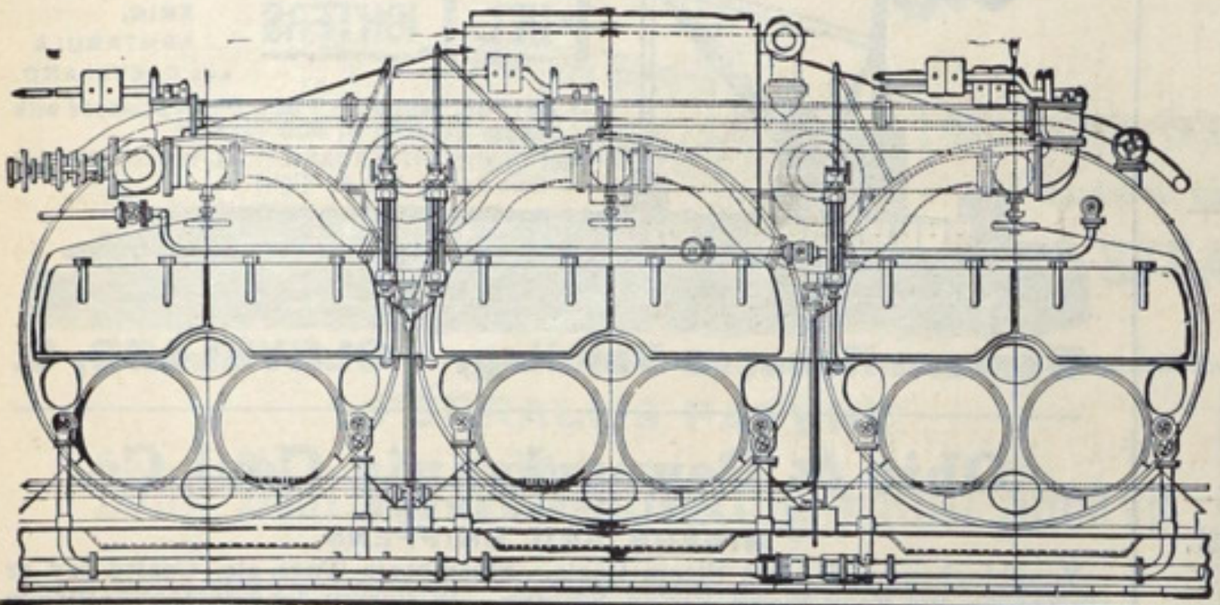

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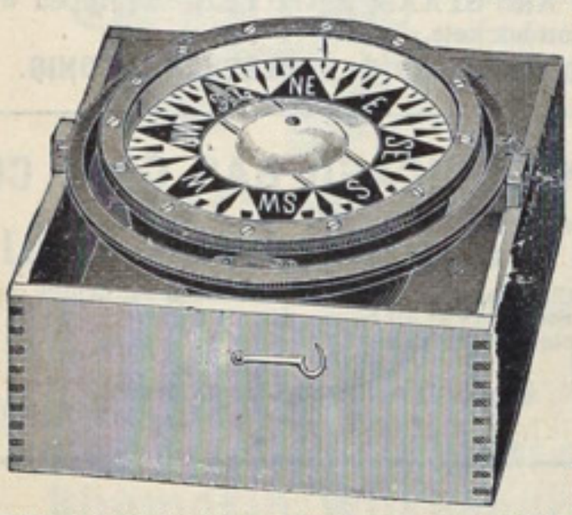

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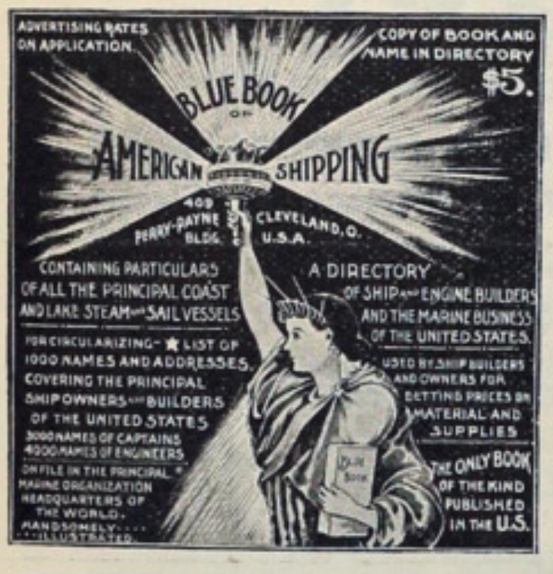
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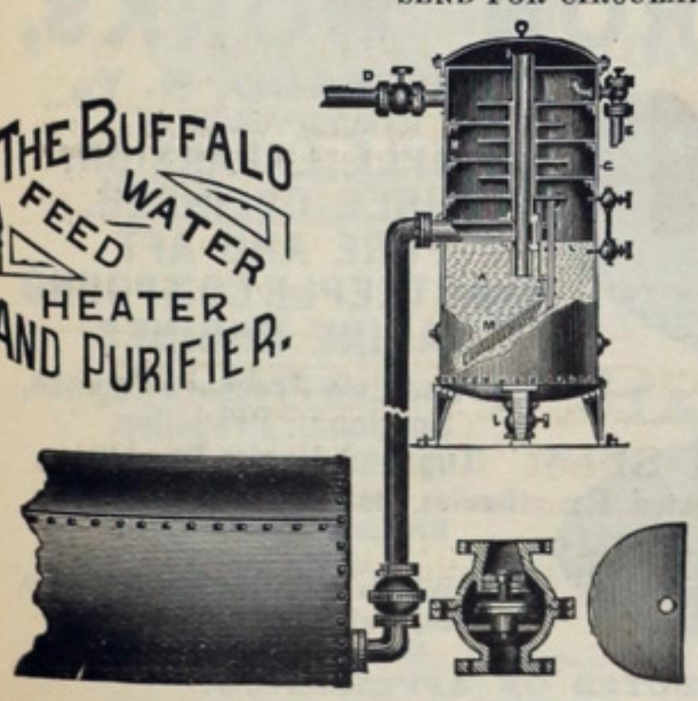

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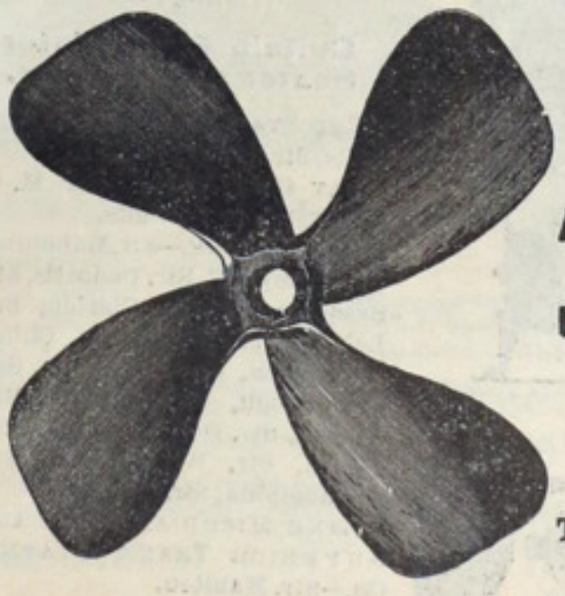

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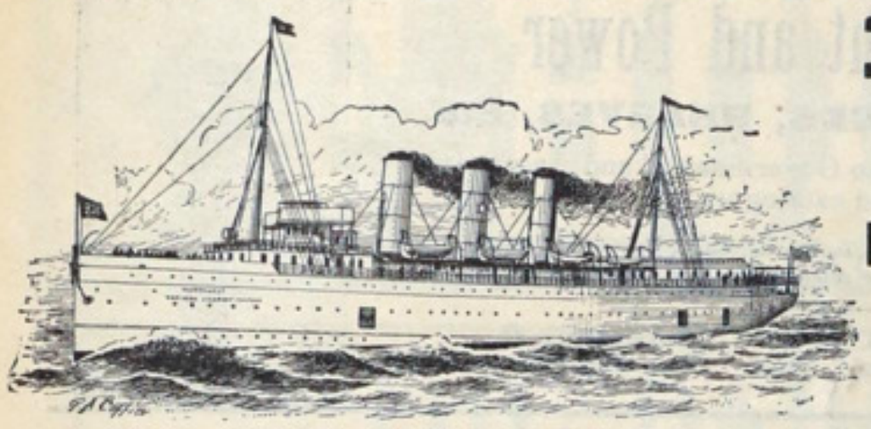

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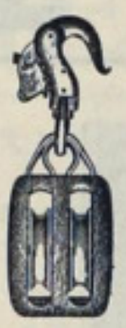

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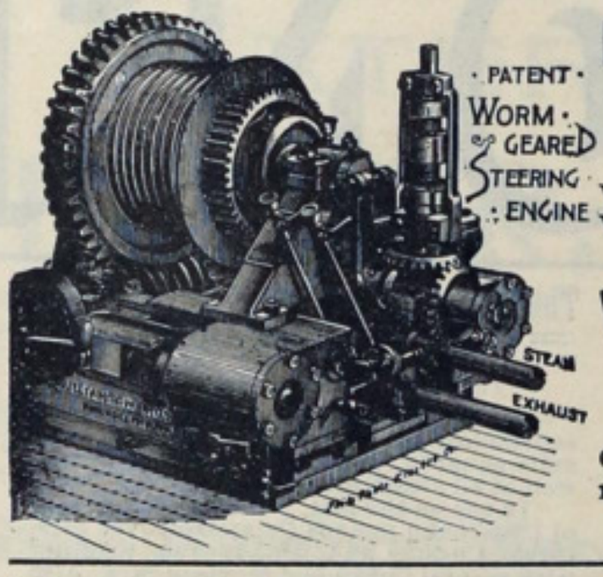

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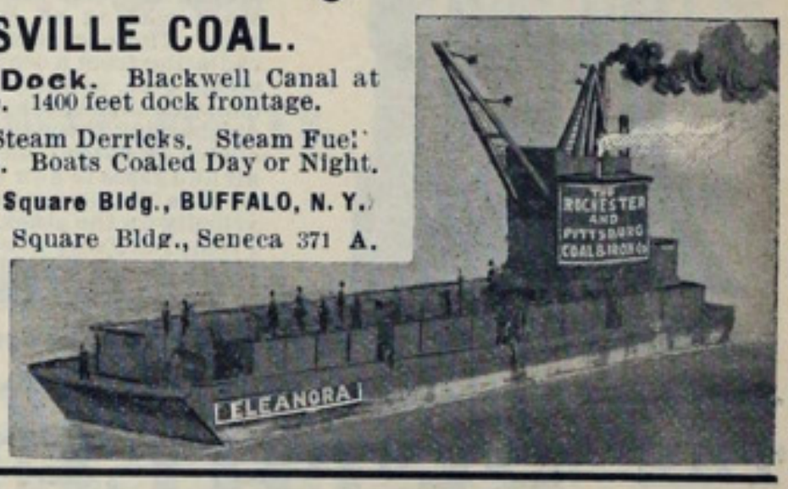

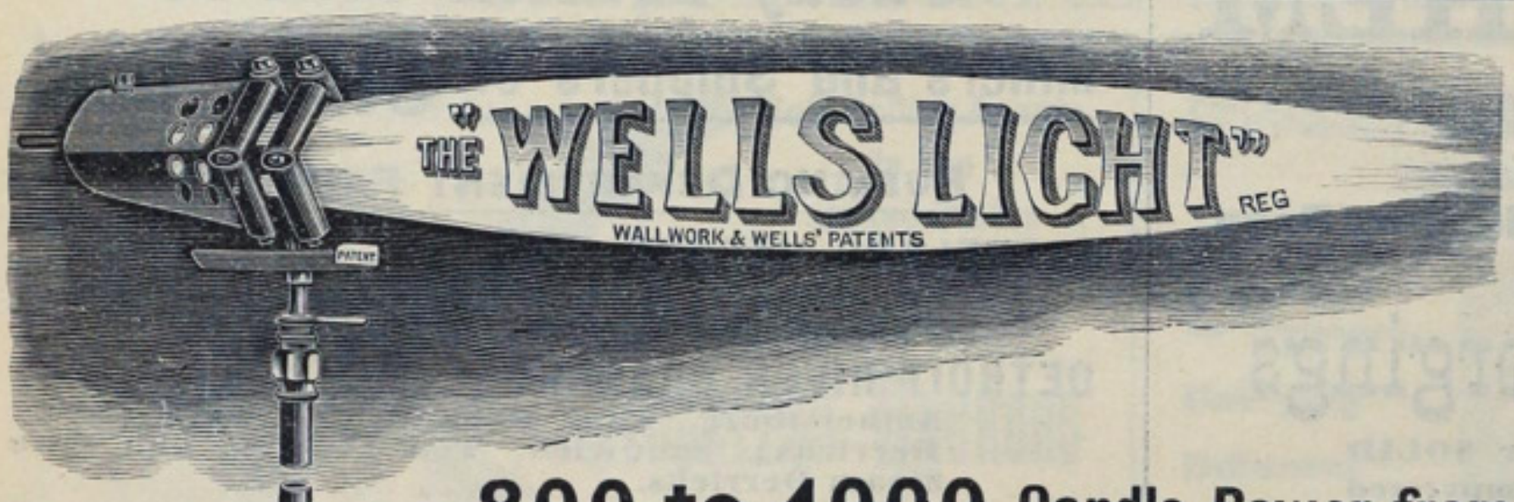

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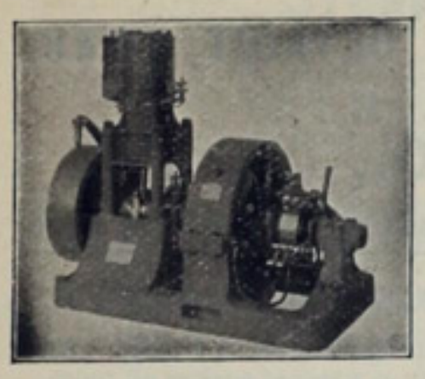

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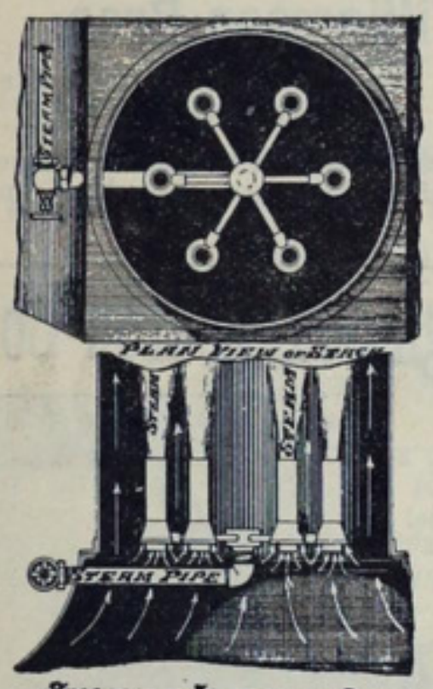

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For Smoke Stacks of Steam Boilers.

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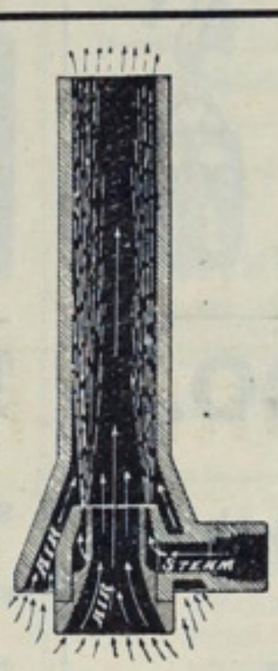

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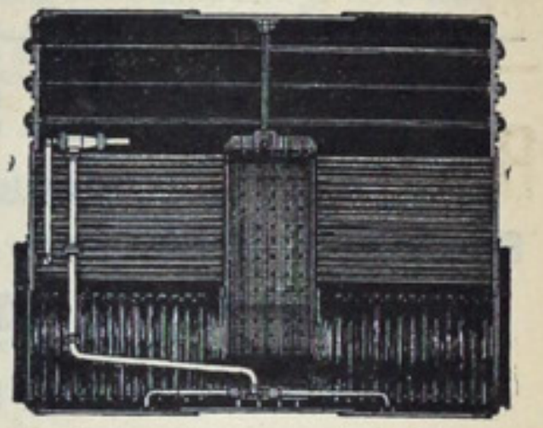

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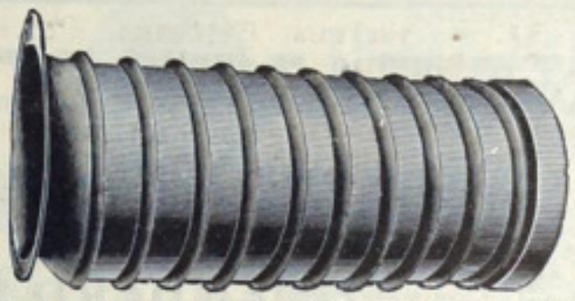

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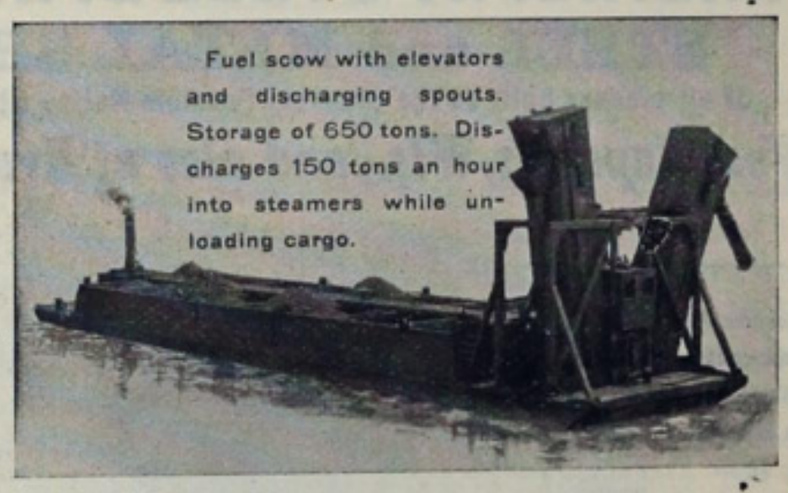
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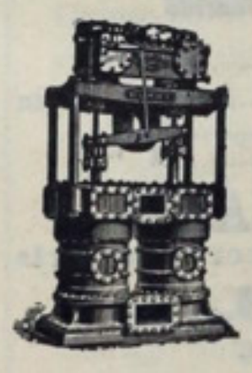

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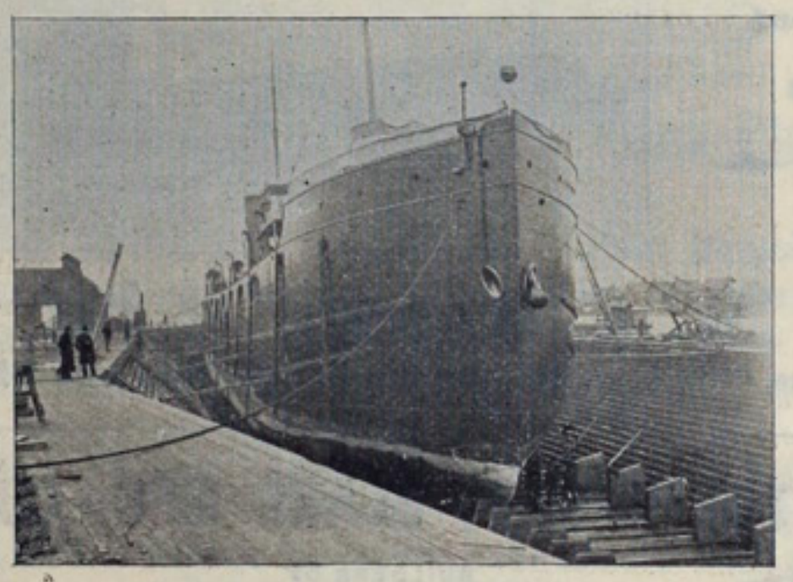

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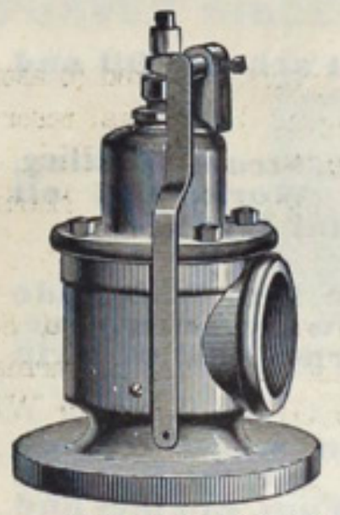

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